Audit & Assessment of Quality of Service

Of

Cellular Mobile Telephone Service

For

Telecom Regulatory Authority of India

North Zone – Delhi Metro Service Area

(July 2014 – September 2014)

PREFACE

The Telecom Regulatory Authority of India (TRAI) was established in 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services. The Authority's mission is to ensure that the interest of consumers are protected and at the same time to nurture conditions for growth of telecommunications, broadcasting and cable services in a manner and at a pace which will enable India to play a leading role in emerging global information society.

The Authority, in exercise of its functions as per the provisions in the TRAI Act, has been entrusted to measure the Quality of Service provided by the Service Providers from time to time and to compare them with the benchmarks so as to assess the level of performance. In pursuance of this, TRAI has appointed **M/s TUV-SUD South Asia Pvt. Ltd**. to carry out "Audit and Assessment of Quality of Service" provided by Basic (Wire line), Cellular Mobile and Broadband service providers in terms of the benchmarks specified in the respective regulations, in North and West Zones.

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **Delhi Metro circle** against the QoS bench marks laid down by TRAI in the respective regulations.

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1. BACKGROUND

1) <u>BACKGROUND</u>

Telecom Regulatory Authority of India has been entrusted to "lay down the standards of quality of service to be provided by the service providers and ensure the quality of service and conduct the periodical survey of such service provided by the service providers so as to protect interest of the consumers of telecommunication services" vide sub-clause (v) of clause (b) of sub-section (1) of section 11 of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997).

The purpose of laying down Quality of Service Parameters is to:

i) Create conditions for consumer satisfaction by making known the quality of service, which the Service provider is required to provide, and the user has a right to expect.

ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.

iii) Generally protect the interests of consumers of telecommunication services.

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd**. for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the "The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20th March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6thOctober, 2006 on zonal basis for **North Zone and West Zone** comprising of the following Telecom Circles/Metro Service Areas":

North Zone: Delhi, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Uttar Pradesh-East and Uttar Pradesh-West (including Uttarakhand). For the cellular mobile telephone service the service area of Delhi includes Ghaziabad, Faridabad, Noida and Gurgaon.

West Zone: Mumbai, Maharashtra (including Goa and excluding Mumbai), Gujarat and Madhya Pradesh (including Chhattisgarh).

The Audit exercise would assess the Quality of Service of telecom operators providing Basic (Wire line), Cellular Mobile (Wireless) and Broadband services by auditing the relevant QoS records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI. The audit would be carried out by **TUV-SUD South Asia** every quarter across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. However, in respect of Basic telephone service (wireline) and Broadband service, a circle would be audited once in a year.

2. OBJECTIVES AND METHODOLOGY

2) OBJECTIVES AND METHODOLOGY:

The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for UP (E), UP (W) and MP&CG circles during the quarter July – September 2014.**

The Scope of work as per the Terms of Reference (TOR) includes the following:

i)   Preparation of Performance Monitoring reports (PMRs) and uploading in the system.

ii)   Live measurements of the performance of Service Providers (SPs) against the benchmarks for three days during each audit.

iii)   Monthly audit based on one month data of the SPs.

iv)   Drive test of the RF networks.

v)   Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators and random customer feedback by calling the customers to get feedback of the services provided by the service providers.

vi)   Transfer of data generated by the RF drive test/Live measurements / PMR/ monthly audit to the server located at TRAI premises on real time basis.

3. SAMPLE SIZE
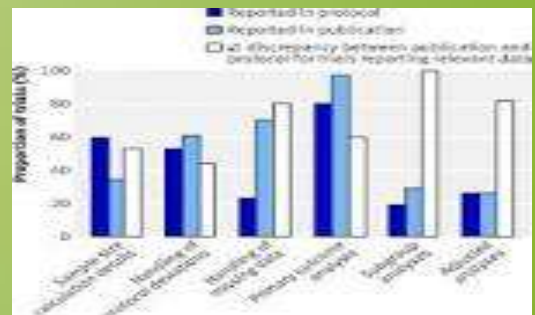
3) SAMPLE SIZE:

3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS

- 100% of the Gateway MSC's (GMSC's) and Mobile Switching Centers (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) were covered for audit in specified circles/service areas. Following are the various operators covered in Delhi Metro circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
GSM Operators		July-14	August-14	September-14	
1	AIRCEL	14 to 16 Jul-14	7 to 8 & 11 Aug-14	17 to 19 Sep-14	Aircel Ltd, Near Sarita Vihar Metro Station, New Delhi
2	AIRTEL	9 to 11 Jul-14	22, 25 to 26 Aug-14	23 to 25 Sep-14	Plot No 16 Udhyog Vihar Ph-4 Gurgaon Haryana.
3	MTNL	11, 14 to 15 Jul-14	18 to 20 Aug-14	10 to 12 Sep-14	MTNL Exchange Karol Bagh Near Rajendra Place Metro Stn.New Delhi.
4	IDEA	16 to 18 Jul-14	26 to 28 Aug-14	24 to 26 Sep-14	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
5	RCOM GSM	16 to 18 Jul-14	25 to 27 Aug-14	19, 22 & 23 Sep-14	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
6	VODAFONE	8 to 10 Jul-14	6 to 8 Aug-14	23 to 25 Sep-14	A-19 Mohan Cooperative Industrial Estates, Mathura Road New Delhi.
CDMA Operators					
7	MTS	21 to 23 Jul-14	11 to 13 Aug-14	21 to 23 Sep-14	A-194 Okhla Phase 1 New Delhi
8	RCOM CDMA	16 to 18 Jul-14	25 to 27 Aug-14	19, 22 & 23 Sep-14	Reliance Center Maharaja Ranjit Singh Hotel, Maharaja Ranjit Singh Marg New Delhi.
9	TATA CDMA	9 to 11 Jul-14	7 to 8 & 11 Aug-14	11 to 12 & 15 Sep-14	TTSL 2 A Old Iswar Nagar Near NFC New Delhi

For all the above operators, audit was conducted in all the three months of the Quarter ended September 2014.

The data generated by monthly PMR and 3-days live measurements audit for the period July 2014 to September 2014 has been successfully uploaded to the server located at TRAI premises.

3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles once in a year. **However**, **QoS audit for basic (wire line) service was not required to be done for Delhi Metro Circle in the quarter ended September 2014, as it has already been done in the QE December 2013.**

3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle once in a year. However, **the QoS audit for Broadband service was not required to be done for Delhi Metro Circle in the quarter ended September 2014, as it has already been done in the QE March 2014.**

4. EXECUTIVE SUMMARY

4) EXECUTIVE SUMMARY:

The executive summary put in a nutshell the key findings of the Audit by providing: -

▪ *"Service provider performance report"* for Cellular mobile, Basic (wire line) and Broadband services , which gives a foretaste of the performance of various operators against the benchmark specified by TRAI, during the months in which the Audit was carried out by TUV-SUD Auditors.

▪ *"Parameter wise critical findings"* for Cellular mobile, Basic (wire line) and Broadband services: This indicates key observations and findings from different activities carried out during the Audit process.

▪ TUV-SUD conducted audit involved a 3 stage verification process which consisted of auditing the records of the service providers and verifying the data submitted to TRAI. The second step involved a three day live measurement of all the network parameters. On the basis of the three days live measurement, the auditors checked the busy hour of the day for the service provider and collected the data for this busy hour for the month in which the audit was conducted Finally, the performance of the service providers was also gauged by conducting drive tests in three select SSAs per service provider per quarter.

▪ The three stage audit / verification viz audit of the records, live measurements and drive tests of all the cellular mobile operators was repeated every month. In case of Basic (Wire line) and Broadband, this exercise is required to be carried out on quarterly basis.

▪ **Essence of compliance report of service providers with respect to the QoS:**

(i) Based on monthly audit, it was concluded that the performance of the service providers was fairly satisfactory for **Network Parameters** in DELHI METRO service area as they were found to have met the benchmarks of most of the parameters during the quarter. Only **Aircel** was non-compliant in respect of the parameters **'Worst affected BTSs due to down time',** and **'Worst affected Cells > 3% TCH Drop'** with its quarterly average performance as **2.55%, and 9.24% (way beyond the benchmark of < 3%)** respectively.

(ii) From three days live assessment, it was found that the performance of all operators was satisfactory as they were largely complying with the benchmarks of parameters except for the parameter '**Worst affected Cell having > 3% TCH drop'** which could not be met by **Aircel** with its performance as **9.35%** (average of the quarter). The performance of **Idea** for parameter **SDCCH Congestion was 1.02%.** Whereas the performance of **RCOM CDMA** for parameters **'Worst Affected Cells** and **CSSR' was 3.04% (July-14)** and **94.56% (Sept-14)** respectively, though their average performance on quarterly basis was well within the benchmark.

(iii) With regard to the **Customer Service Quality Parameters,** service providers were found in well compliance of most of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, **RCOM (GSM)** and **RCOM (CDMA)** failed to meet the benchmark of **'% billing complaints – Prepaid'** with their performance as **0.30% and 0.11%** respectively. **Airtel** remained under performed for the parameter

"Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints" with its performance value as **99.93%** marginally below the benchmark of 100%.

In case of the parameter **'Termination / Closure of Service', Aircel** and **Vodafone** could settle **99.74% and 96.99%** cases of closure within 7 days. Regarding the parameter **'Time taken for refunds of deposits'**, **Airtel, Idea**, **MTS and Tata CDMA** lagged behind the benchmark with their performance as **99.98%, 96.37%, 0.00% and 99.93%** respectively**. MTS** failed to settle even a single case of refund out of 8 cases due for refund.

In case of the parameter **'Calls answered by Operators (voice to voice)'** all service providers are in compliance with respect to the parameter accessibility of call center. However, **Airtel & RCOM (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within **90 seconds** as they provided the data for 90 seconds. They have achieved their performance as **94.73% and 94.45%** respectively against the benchmark of >=95%.

During 3 days live measurement, **Airtel and RCOM (GSM)** has not met the benchmark of 'calls answered by Operators (voice to voice) within **90 seconds** as they provided the data for 90 seconds. They have achieved their performance as **92.40% and 92.07%** respectively against the benchmark of >=95%.

(iv) With regard to **Drive Test**, it was concluded that the performance of the service providers with respect to the parameter '**Voice Quality'** remained main area of concern as **majority of operators** failed to comply with its bench mark. However, apart from Voice Quality, **MTNL** remained non- compliant in respect of other parameters also like **Call Drop rate, Call setup success rate and Blocked Call rate**, in different areas of Delhi/NCR region. These operators need to take corrective action to improve their networks.

5. PMR AUDIT REPORT

5) PMR AUDIT REPORTS:

5.1 MONTHLY PMR:

5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRCEL	Sept-14	20:00 - 21:00
2	AIRTEL	Sept-14	20:00 - 21:00
3	MTNL	Sept-14	20:00 - 21:00
4	IDEA	Sept-14	20:00 - 21:00
5	RCOM GSM	Sept-14	19:00 - 20:00
6	VODAFONE	Sept-14	20:00 - 21:00
CDMA Operators			
7	MTS	Sept-14	20:00 - 21:00
8	RCOM CDMA	Sept-14	20:00 - 21:00
9	TATA CDMA	Sept-14	12:00 - 13:00

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Delhi metro circle.

5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
GSM Operators						
1	AIRCEL	4	23	3131	NSN	NSN
2	AIRTEL	31	54	5570	Ericsson	Ericsson
3	MTNL	6	31	1119	NSN	NSN
4	IDEA	10	38	4678	NSN	NSN
5	RCOM GSM	4	14	2537	Huawei	Huawei
6	VODAFONE	15	54	5902	Ericsson	Ericsson
CDMA Operators						
7	MTS	1	5	967	ZTE	ZTE
8	RCOM CDMA	7	NA	997	Lucent & ZTE	Lucent
9	TATA CDMA	8	8	1499	Huawei	Huawei

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY 14 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- JULY 14 MONTH										
	PMR Generation Data	Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
S/N	**Name of Parameter**			GSM Operators						CDMA Operators		
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	July-14	0.52%	0.01%	0.37%	0.01%	0.42%	0.16%	0.23%	0.19%	0.09%
	b) Worst affected BTSs due to downtime	<=2%	July-14	**3.24%**	0.00%	1.52%	0.00%	0.87%	0.90%	1.57%	0.10%	0.07%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	96.98%	99.82%	96.37%	99.95%	99.57%	99.69%	98.18%	97.63%	98.83%
	b) SDCCH/PAGING Channel congestion	<=1%	July-14	0.91%	0.04%	0.60%	0.68%	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	1.90%	0.10%	1.66%	1.05%	0.07%	0.11%	0.85%	0.08%	0.17%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	July-14	1.58%	0.68%	1.83%	0.56%	0.38%	0.88%	0.84%	0.43%	0.71%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	July-14	**11.04%**	0.95%	2.06%	1.55%	0.12%	2.79%	1.46%	2.57%	2.91%
	c) Connections with good voice quality	>=95%	July-14	97.07%	99.22%	96.85%	98.78%	98.77%	97.66%	99.18%	99.79%	99.04%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	July-14	0	0	0	0	0	0	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - AUGUST 14 MONTH

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	PMR Generation Data						GSM Operators				CDMA Operators	
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Aug-14	0.49%	0.01%	0.44%	0.01%	0.26%	0.11%	0.12%	0.11%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Aug-14	**2.62%**	0.00%	1.88%	0.00%	0.39%	0.63%	0.21%	0.10%	0.20%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	97.20%	99.78%	96.58%	99.96%	99.61%	99.71%	98.87%	97.65%	99.01%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-14	0.62%	0.05%	0.56%	0.49%	0.05%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	1.61%	0.14%	1.63%	0.84%	0.05%	0.07%	0.18%	0.06%	0.07%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Aug-14	1.33%	0.69%	1.82%	0.55%	0.34%	0.88%	0.72%	0.32%	0.61%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-14	**8.64%**	0.99%	2.22%	1.45%	0.10%	2.84%	2.68%	2.38%	2.66%
	c) Connections with good voice quality	>=95%	Aug-14	97.34%	99.23%	96.93%	98.83%	98.81%	97.79%	99.19%	99.79%	99.07%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Aug-14	0	0	0	0	0	0	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - SEPTEMBER 14 MONTH
	PMR Generation Data	**Bench- mark**	**Audit Period**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			colspan="6"	**GSM Operators**	colspan="3"	**CDMA Operators**
Network Service Quality Parameter
Network Availability
1	a) BTS Accumulated Downtime	<=2%	Sep-14	0.36%	0.01%	0.48%	0.01%	0.29%	0.09%	0.12%	0.17%	0.09%
	b) Worst affected BTSs due to downtime	<=2%	Sep-14	1.79%	0.00%	1.70%	0.00%	0.39%	0.48%	0.93%	0.00%	0.20%
Connection Establishment (Accessibility)
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	97.25%	99.78%	96.42%	99.96%	99.59%	99.71%	98.77%	96.99%	99.08%
	b) SDCCH/PAGING Channel congestion	<=1%	Sep-14	0.45%	0.03%	0.66%	0.34%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	1.73%	0.16%	1.73%	0.81%	0.05%	0.06%	0.17%	0.07%	0.05%
Connection maintenance (Retainability)
3	a) CDR (Call Drop Rate)	<=2%	Sep-14	1.27%	0.71%	1.83%	0.56%	0.39%	0.94%	0.84%	0.38%	0.41%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Sep-14	**8.03%**	0.96%	2.58%	1.44%	0.08%	2.68%	1.69%	2.05%	2.58%
	c) Connections with good voice quality	>=95%	Sep-14	97.55%	99.19%	96.98%	98.78%	98.75%	97.64%	99.19%	99.79%	98.98%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Sep-14	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- SEPTEMBER 14 (JULY TO SEPTEMBER 2014 MONTHS AUDITED DATA)

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	PMR Generation Data			GSM Operators						CDMA Operators		
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.46%	0.01%	0.43%	0.01%	0.32%	0.12%	0.16%	0.16%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	**2.55%**	0.00%	1.70%	0.00%	0.55%	0.67%	0.90%	0.07%	0.16%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.14%	99.79%	96.46%	99.96%	99.59%	99.70%	98.61%	97.42%	98.97%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.66%	0.04%	0.61%	0.50%	0.03%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.75%	0.13%	1.67%	0.90%	0.06%	0.08%	0.40%	0.07%	0.10%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.39%	0.69%	1.83%	0.56%	0.37%	0.90%	0.80%	0.38%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**9.24%**	0.97%	2.29%	1.48%	0.10%	2.77%	1.94%	2.33%	2.72%
	c) Connections with good voice quality	>=95%	Quarterly	97.32%	99.21%	96.92%	98.80%	98.78%	97.70%	99.19%	99.79%	99.03%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0

Table title: **QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-SEPTEMBER-14) OF DELHI METRO CIRCLE**

5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:

The audit of network related parameters for cellular mobile service providers was conducted at their respective MSCs in the circles.

TUV conducted audit for cellular mobile operators based on **three stage audit / verification viz audit of the records, live measurements and drive tests. This exercise has been repeated every month for CMSPs.**

Network Service Quality Parameters:

- ▪ **Network Availability**

    i.   BTS Accumulated Downtime (Not Available for Service):
    ii. Worst affected BTSs due to downtime

For measuring the performance against the benchmark for this parameter, down time of each BTS lasting for more than 1 hour at a time in a day during the period of a month has been taken for computation.

In Delhi Metro circle, the audit with respect to this parameter revealed that all the operators **(except Aircel)** met the benchmark for this parameter. **Aircel** could not meet the benchmark for the parameter **'Worst affected BTSs due to downtime'** with its average performance of **2.55%.**

- ▪ **Connection Establishment (Accessibility)**

    i.   Call Set-up Success Rate(CSSR)

CSSR includes complete signaling in the call set up process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (POI). CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made.

All operators were in compliance on the benchmark for this parameter.

- ▪ **Parameters related to Network Congestion:**

The parameters namely SDCCH / Paging Channel Congestion, TCH and POI are prescribed with the aim of measuring the congestion in the network.

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio (**PCH Average Using Ratio**) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the pegging channel in CDMA system.

With respect to this parameter, the performance of the operators is quite satisfactory as all operators met the TRAI specified benchmarks on TCH/SDCCH/Paging Channel congestion parameters.

There was no congestion on individual POI links between a service provider vis-à-vis other service.

- **Connection Maintenance (Retainability)**

    i. Call Drop Rate:

This parameter gives a reliable measurement of the mobile network used by the service provider for maintaining a call once it has been correctly established. Failures in coverage, network congestion and network failures have important impact on this parameter.

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, **all the service providers were found to be meeting the TRAI specified benchmark.** The lowest call drop rate (average 0 .37%) was for RCOM (GSM) during the quarter.

    ii. Worst affected cells having more than 3% TCH drops

Worst affected cells are defined as cells in which the call drop rate exceeds 3% during cell Bouncing Busy Hour (CBBH) or at any other hour of a day.

The audit results for this parameter indicate that all operators **(except Aircel)** have met the bench mark successfully during the quarter. Quarterly average performance of **Aircel** was **9.24%**, much beyond the benchmark of <=3%..

    iii. Connections with good voice quality:

The audit results for this parameter indicate that **all operators have met the benchmark during the quarter.**

    iv. No. of POI's having >=0.5% POI congestion:

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter as there was no individual POI having congestion > 0.5%.

3-DAYS LIVE MEASUREMENT DATA VERIFICATION FOR

CELLULAR MOBILE SERVICE PROVIDERS

(NETWORK SERVICE QUALITY PARAMETER)

5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER):

5.2.1 LIVE MEASURMENT DATA (3-DAYS) – JULY 14 MONTH:

				GSM Operators						CDMA Operators		
CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE – JULY 14 MONTH												
Live measurement Data		**Bench-mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**											
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	**<=2%**	Live data	0.39%	0.02%	0.21%	0.03%	0.42%	0.10%	0.08%	0.23%	0.14%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	97.18%	99.83%	96.47%	99.94%	99.61%	99.70%	98.33%	98.54%	98.91%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.82%	0.04%	0.51%	**2.25%**	0.04%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.64%	0.09%	1.74%	1.24%	0.06%	0.11%	0.66%	0.07%	0.08%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.47%	0.64%	1.84%	0.60%	0.38%	0.84%	0.83%	0.39%	0.71%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**10.14%**	0.89%	2.08%	1.54%	0.11%	2.78%	2.53%	**3.04%**	2.72%
	c) Connections with good voice quality	**>=95%**	Live data	97.07%	99.26%	96.87%	98.76%	98.73%	97.66%	99.18%	99.79%	99.02%
4	No. of POI having >=0.5% congestion	**<0.5%**	Live data	0	0	0	0	0	0	0	0	0

5.2.2 LIVE MEASURMENT DATA (3-DAYS) – AUGUST 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE - AUGUST 14 MONTH
	Live measurement Data	**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			colspan="6"	**GSM Operators**	colspan="3"	**CDMA Operators**
Network Service Quality Parameter
Network Availability
1	a) BTS Accumulated Downtime	**<=2%**	Live data	0.47%	0.01%	0.40%	0.02%	0.31%	0.12%	0.08%	0.15%	0.04%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	97.13%	99.80%	96.72%	99.95%	99.62%	99.73%	98.98%	98.16%	99.01%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.41%	0.02%	0.61%	0.52%	0.08%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.33%	0.17%	1.55%	0.85%	0.05%	0.06%	0.09%	0.03%	0.09%
Connection maintenance (Retainability)
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.47%	0.68%	1.82%	0.52%	0.32%	0.89%	0.70%	0.31%	0.61%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**10.03%**	0.94%	2.44%	1.36%	0.07%	2.86%	1.49%	2.91%	2.59%
	c) Connections with good voice quality	**>=95%**	Live data	97.10%	99.26%	96.95%	98.82%	98.75%	97.78%	99.19%	99.79%	99.08%
4	No. of POI having >=0.5% congestion	**<0.5%**	Live data	0	0	0	0	0	0	0	0	0

5.2.3 LIVE MEASURMENT DATA (3-DAYS) – SEPTEMBER 14 MONTH:

	CELLULAR MOBILE TELEPHONE SERVICES DELHI METRO CIRCLE- SEPTEMBER 14 MONTH											
Live measurement Data		**Bench- mark**	**Average of 3 Days**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			GSM Operators						CDMA Operators		
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	**<=2%**	Live data	0.46%	0.01%	0.37%	0.01%	0.44%	0.08%	0.11%	0.15%	0.03%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.00%	0.18%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	97.12%	99.81%	96.66%	99.96%	99.60%	99.72%	98.93%	**94.56%**	99.03%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.44%	0.03%	0.55%	0.28%	0.02%	0.00%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	1.62%	0.14%	1.65%	0.69%	0.05%	0.06%	0.07%	0.11%	0.07%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	1.23%	0.67%	1.75%	0.52%	0.37%	0.89%	0.78%	0.46%	0.43%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	**7.89%**	0.90%	2.61%	1.44%	0.11%	2.70%	1.68%	2.22%	1.74%
	c) Connections with good voice quality	**>=95%**	Live data	97.54%	99.23%	97.01%	98.84%	98.76%	97.64%	99.20%	99.80%	99.07%
4	No. of POI having >=0.5% congestion	**<0.5%**	Live data	0	0	0	0	0	0	0	0	0

5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JULY TO SEPTEMBER 2014 MONTHS AUDITED DATA)

				AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	PMR Generation Data	**Bench- mark**	**Audit Period**				GSM Operators				CDMA Operators	
S/N	Name of Parameter											
	Network Service Quality Parameter											
	Network Availability											
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.44%	0.01%	0.33%	0.02%	0.39%	0.10%	0.09%	0.18%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.12%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.14%	99.81%	96.62%	99.95%	99.61%	99.72%	98.75%	97.09%	98.98%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.56%	0.03%	0.56%	**1.02%**	0.05%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	1.53%	0.13%	1.65%	0.93%	0.05%	0.08%	0.27%	0.07%	0.08%
	Connection maintenance (Retainability)											
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.39%	0.66%	1.80%	0.55%	0.36%	0.87%	0.77%	0.39%	0.58%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	**9.35%**	0.91%	2.38%	1.45%	0.10%	2.78%	1.90%	2.72%	2.35%
	c) Connections with good voice quality	>=95%	Quarterly	97.24%	99.25%	96.94%	98.81%	98.75%	97.69%	99.19%	99.79%	99.06%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0

5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live assessment, it was found that the performance of all operators was satisfactory as they were largely complying with the benchmarks of parameters except for the parameter '**Worst affected Cell having > 3% TCH drop**' which could not be met by **Aircel** with its performance as **9.35%** (average of the quarter). The performance of **Idea** for parameter **SDCCH Congestion** was **1.02%**. Whereas the performance of **RCOM CDMA** for parameters '**Worst Affected Cells and CSSR**' was **3.04% (July-14)** and **94.56% (Sept-14)** respectively, though their quarterly average performance was well within the benchmark.

Aircel has shown the similar non compliance for this parameter in case of monthly audit.

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services - Delhi Metro Circle – July 14 month

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		July-14	2997	5502	1118	4680	2541	5746	954	999	1497
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		July-14	11688	481	3074	310	7908	6716	1648	1446	998
	c) BTS Accumulated Downtime	<=2%	July-14	0.52%	0.01%	0.37%	0.01%	0.42%	0.16%	0.23%	0.19%	0.09%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		July-14	97	0	17	0	22	52	15	1	1
	e) Worst affected BTSs due to downtime	<=2%	July-14	3.24%	0.00%	1.52%	0.00%	0.87%	0.90%	1.57%	0.10%	0.07%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	96.98%	99.82%	96.37%	99.95%	99.57%	99.69%	98.18%	97.63%	98.83%
	b) SDCCH/PAGING Congestion	<=1%	July-14	0.91%	0.04%	0.60%	0.68%	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	1.90%	0.10%	1.66%	1.05%	0.07%	0.11%	0.85%	0.08%	0.17%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	July-14	1.58%	0.68%	1.83%	0.56%	0.38%	0.88%	0.84%	0.43%	0.71%
	b) Worst affected cells>3% TCH drop	<=3%	July-14	11.04%	0.95%	2.06%	1.55%	0.12%	2.79%	1.46%	2.57%	2.91%
	c) % of connections with good voice quality	>=95%	July-14	97.07%	99.22%	96.85%	98.78%	98.77%	97.66%	99.18%	99.79%	99.04%
	d)Total No. of cells exceeding 3% TCH drop (call drop)		July-14	987	132	66	199	8	397	46	76	150
	e) Total no. of cells (Sector) in the licensed service area		July-14	8938	13951	3185	12797	6996	14218	3125	2949	5143
	No. of POI's having >=0.5% POI congestion											
4	No. of POI's having >=0.5% POI congestion		July-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		July-14	0	0	0	0	0	0	0	0	0
	Network Data											
5	a) Equipped Capacity of Network in Erlang		July-14	118946	293899	100000	160539	96000	306858	42000	140000	292330
	b) Total traffic in TCBH in erlang (Avg.)		July-14	81455	214094	24907	153459	71147	229516	17449	95968	115429
	c) Total no. of customers served (as per VLR) on last day of the month		July-14	2645802	8879423	1052526	5390743	4903455	9063510	456224	2851245	1694811

TABLE: 2

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Delhi Metro Circle- July 14 month						GSM Operators				CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Live data	2979	5494	1119	4677	2543	5726	950	998	1494
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	833	70	173	105	764	410	58	169	148
	c) BTS Accumulated Downtime	<=2%	Live data	0.39%	0.02%	0.21%	0.03%	0.42%	0.10%	0.08%	0.23%	0.14%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.18%	99.83%	96.47%	99.94%	99.61%	99.70%	98.33%	98.54%	98.91%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.82%	0.04%	0.51%	**2.25%**	0.04%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.64%	0.09%	1.74%	1.24%	0.06%	0.11%	0.66%	0.07%	0.08%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.47%	0.64%	1.84%	0.60%	0.38%	0.84%	0.83%	0.39%	0.71%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**10.14%**	0.89%	2.08%	1.54%	0.11%	2.78%	2.53%	**3.04%**	2.72%
	c) % of connections with good voice quality	>=95%	Live data	97.07%	99.26%	96.87%	98.76%	98.73%	97.66%	99.18%	99.79%	99.02%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	905	124	66	197	8	399	80	89	140
	e) Total no. of cells (Sector) in the licensed service area		Live data	8926	14012	3185	12799	6998	14367	3152	2939	5140
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 3

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Aug-14	3055	5521	1119	4678	2541	5731	959	999	1498
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Aug-14	11103	529	3702	397	4997	4607	883	834	659
	c) BTS Accumulated Downtime	<=2%	Aug-14	0.49%	0.01%	0.44%	0.01%	0.26%	0.11%	0.12%	0.11%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Aug-14	80	0	21	0	10	36	2	1	3
	e) Worst affected BTSs due to downtime	<=2%	Aug-14	**2.62%**	0.00%	1.88%	0.00%	0.39%	0.63%	0.21%	0.10%	0.20%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	97.20%	99.78%	96.58%	99.96%	99.61%	99.71%	98.87%	97.65%	99.01%
	b) SDCCH/PAGING Congestion	<=1%	Aug-14	0.62%	0.05%	0.56%	0.49%	0.05%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	1.61%	0.14%	1.63%	0.84%	0.05%	0.07%	0.18%	0.06%	0.07%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Aug-14	1.33%	0.69%	1.82%	0.55%	0.34%	0.88%	0.72%	0.32%	0.61%
	b) Worst affected cells>3% TCH drop	<=3%	Aug-14	**8.64%**	0.99%	2.22%	1.45%	0.10%	2.84%	2.68%	2.38%	2.66%
	c) % of connections with good voice quality	>=95%	Aug-14	97.34%	99.23%	96.93%	98.83%	98.81%	97.79%	99.19%	99.79%	99.07%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Aug-14	751	139	71	186	7	408	85	70	137
	e) Total no. of cells (Sector) in the licensed service area		Aug-14	8692	13999	3195	12821	6995	14363	3186	2949	5151
	No. of POI's having >=0.5% POI congestion											
4	No. of POI's having >=0.5% POI congestion		Aug-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Aug-14	0	0	0	0	0	0	0	0	0
	Network Data											
5	a) Equipped Capacity of Network in Erlang		Aug-14	120975	293073	NP	160469	96000	288777	42000	140000	292429
	b) Total traffic in TCBH in erlang (Avg.)		Aug-14	83521	208324	NP	150578	77061	230679	16469	96527	113746
	c) Total no. of customers served (as per VLR) on last day of the month		Aug-14	2852550	9290919	NP	5605476	4960672	8963555	471032	2855981	1658823

NP: Data not provided

TABLE: 4

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
						GSM Operators					CDMA Operators	
Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Delhi Metro Circle – August 14 month												

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
						GSM Operators					CDMA Operators	
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Live data	2996	5457	1119	4672	2540	5746	955	999	1498
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	1019	55	324	82	571	489	54	105	48
	c) BTS Accumulated Downtime	<=2%	Live data	0.47%	0.01%	0.40%	0.02%	0.31%	0.12%	0.08%	0.15%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	2	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.13%	99.80%	96.72%	99.95%	99.62%	99.73%	98.98%	98.16%	99.01%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.41%	0.02%	0.61%	0.52%	0.08%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.33%	0.17%	1.55%	0.85%	0.05%	0.06%	0.09%	0.03%	0.09%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.47%	0.68%	1.82%	0.52%	0.32%	0.89%	0.70%	0.31%	0.61%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**10.03%**	0.94%	2.44%	1.36%	0.07%	2.86%	1.49%	2.91%	2.59%
	c) % of connections with good voice quality	>=95%	Live data	97.10%	99.26%	96.95%	98.82%	98.75%	97.78%	99.19%	99.79%	99.08%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	865	130	78	175	5	411	47	86	134
	e) Total no. of cells (Sector) in the licensed service area		Live data	8627	13933	3196	12823	6993	14371	3181	2945	5152
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 5

S/N	Name of Parameter	Bench-mark	Audit Period	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
						GSM Operators				CDMA Operators		
Network Service Quality Parameter												
1	**Network Availability**											
	a) Total no. of BTSs in the licensed service area		Sep-14	3131	5570	1119	4678	2537	5788	969	997	1499
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Sep-14	8088	380	3843	450	5473	3801	820	1238	937
	c) BTS Accumulated Downtime	<=2%	Sep-14	0.36%	0.01%	0.48%	0.01%	0.29%	0.09%	0.12%	0.17%	0.09%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Sep-14	56	0	19	0	10	28	9	0	3
	e) Worst affected BTSs due to downtime	<=2%	Sep-14	1.79%	0.00%	1.70%	0.00%	0.39%	0.48%	0.93%	0.00%	0.20%
2	**Connection Establishment (Accessibility)**											
	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	97.25%	99.78%	96.42%	99.96%	99.59%	99.71%	98.77%	96.99%	99.08%
	b) SDCCH/PAGING Congestion	<=1%	Sep-14	0.45%	0.03%	0.66%	0.34%	0.02%	0.01%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	1.73%	0.16%	1.73%	0.81%	0.05%	0.06%	0.17%	0.07%	0.05%
3	**Connection Maintenance (Retainability)**											
	a) Call Drop Rate (CDR)	<=2%	Sep-14	1.27%	0.71%	1.83%	0.56%	0.39%	0.94%	0.84%	0.38%	0.41%
	b) Worst affected cells>3% TCH drop	<=3%	Sep-14	**8.03%**	0.96%	2.58%	1.44%	0.08%	2.68%	1.69%	2.05%	2.58%
	c) % of connections with good voice quality	>=95%	Sep-14	97.55%	99.19%	96.98%	98.78%	98.75%	97.64%	99.19%	99.79%	98.98%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Sep-14	717	136	83	184	6	387	55	60	133
	e) Total no. of cells (Sector) in the licensed service area		Sep-14	8933	14128	3201	12829	6987	14445	3258	2943	5152
4	**No. of POI's having >=0.5% POI congestion**											
	No. of POI's having >=0.5% POI congestion		Sep-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Sep-14	0	0	0	0	0	0	0	0	0
5	**Network Data**											
	a) Equipped Capacity of Network in Erlang		Sep-14	123191	293883	NP	160853	96000	289724	42000	140000	292472
	b) Total traffic in TCBH in erlang (Avg.)		Sep-14	89167	218676	NP	153334	74898	239174	16625	104749	108956
	c) Total no. of customers served (as per VLR) on last day of the month		Sep-14	2914980	9032232	NP	5439698	4986373	9447983	471232	2848447	1641454

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Delhi Metro Circle- September 14 month

NP: Data not provided

TABLE: 6

S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live - Delhi Metro Circle – Sept 14 month
						GSM Operators				CDMA Operators		
Network Service Quality Parameter												
	Network Availability											
1	a) Total no. of BTSs in the licensed service area		Live data	3113	5571	1119	4678	2536	5761	969	996	1498
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	1021.22	38.64	297	27.31	803.67	336.13	75.78	106.22	27.87
	c) BTS Accumulated Downtime	<=2%	Live data	0.46%	0.01%	0.37%	0.01%	0.44%	0.08%	0.11%	0.15%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	2	0	0	1	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.18%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)											
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.12%	99.81%	96.66%	99.96%	99.60%	99.72%	98.93%	**94.56%**	99.03%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.44%	0.03%	0.55%	0.28%	0.02%	0.00%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.62%	0.14%	1.65%	0.69%	0.05%	0.06%	0.07%	0.11%	0.07%
	Connection Maintenance (Retainability)											
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.23%	0.67%	1.75%	0.52%	0.37%	0.89%	0.78%	0.46%	0.43%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	**7.89%**	0.90%	2.61%	1.44%	0.11%	2.70%	1.68%	2.22%	1.74%
	c) % of connections with good voice quality	>=95%	Live data	97.54%	99.23%	97.01%	98.84%	98.76%	97.64%	99.20%	99.80%	99.07%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	708	128	84	185	8	393	56	65	90
	e) Total no. of cells (Sector) in the licensed service area		Live data	8974	14160	3201	12829	6984	14564	3308	2940	5152
	No. of POI's having >=0.5% POI congestion											
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE SEPT-14:

5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER 2014 MONTHS AUDITED DATA):

	QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE SEPTEMBER 14											
	Quarterly CSD Audit Data	**Bench-mark**	**Circle Name**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM GSM**	**VODAFONE**	**MTS**	**RCOM CDMA**	**TATA CDMA**
S/N	**Name of Parameter**			**GSM Operators**						**CDMA Operators**		
	Customer Service Quality Parameters											
	Metering & Billing Credibility -Post Paid											
1	A) No. of bills issued during the quarter		Delhi	177903	4654480	431955	2139542	409280	5222783	2320	842659	436383
	B) No. of bills disputed including billing complaints during the quarter		Delhi	4	1117	234	880	399	4339	1	830	14
	C)% of billing complaints during the quarter	<= 0.1%	Delhi	0.002%	0.02%	0.05%	0.04%	0.10%	0.08%	0.04%	0.10%	0.003%
	Metering & Billing Credibility -Pre Paid											
2	A) Total No. of Pre-paid customers at the end of the quarter		Delhi	4417124	8652682	2086313	4987269	4875990	7471313	997830	2679041	2443700
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Delhi	1	173	326	1352	14425	4870	524	3007	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	Delhi	0.00%	0.002%	0.02%	0.03%	**0.30%**	0.07%	0.05%	**0.11%**	0.00%
	Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints											
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		Delhi	5	1290	560	9702	14824	9209	525	3837	1021
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		Delhi	5	1290	560	9702	14824	9209	525	3837	1021
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	Delhi	100.00%	**99.93%**	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	**Response time to customers for assistance**										
	A) Total no of calls attempted to customer care/Call center		Delhi	22841171	2845805	1283004	16796202	26687922	29865081	2888774	2514673	561754
	B) Total no. of calls successfully established to customer care/Call center		Delhi	22287954	2787070	1242725	16469522	26292568	29865076	2882838	2468689	557876
	C) % Accessibility of Call centre /customer Care (Total call successfully established *100/ Total call attempt)	>=95%	Delhi	97.58%	97.94%	96.86%	98.06%	98.52%	100.00%	99.79%	98.17%	99.31%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Delhi	4373570	9242982	707141	6820954	2342611	9569698	1325515	593510	890876
	E) Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		Delhi	4069751	8755944	656996	6690851	2212518	9413813	1229277	575548	872765
	F) % age of calls answered by operator (voice to voice) (Total call successfully established within 60 Sec/ 90 sec *100/ Total call attempt.)	>=90% (60 Sec.) & >=95% (90 Sec.)	Delhi	93.05%	***94.73%**	92.91%	98.09%	***94.45%**	*98.37%	92.74%	*96.97%	*97.97%
5	**Termination/closure of service**										
	A) Total No. of requests for Termination / Closure of service received during the quarter		Delhi	1932	22996	19	25230	5135	13458	6	7631	2823
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Delhi	1927	22996	19	25230	5135	13053	6	7631	2823
	C) % of Termination/ Closure of service within 7 days	<=7days	Delhi	**99.74%**	100.00%	100.00%	100.00%	100.00%	**96.99%**	100.00%	100.00%	100.00%
6	**Time taken for refunds of deposits after closures.**										
	A) No. of Payments/ Refunds due during the quarter		Delhi	1952	5340	229	6218	2482	8067	8	3176	2897
	B) No. of Payments/ Refunds Cleared during the quarter		Delhi	1952	5339	229	5992	2482	8067	0	3176	2895
	C) Time taken for refunds of deposits after closures.	100% within 60 days	Delhi	100.00%	**99.98%**	100.00%	**96.37%**	100.00%	100.00%	**0.00%**	100.00%	**99.93%**

*Call answered by operators (voice to voice) in 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21st August 2014.

NP: Data not provided

5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-SEPT 2014):

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE – SEPTEMBER 14												
3 days live CSD Audit Data		**Bench-mark**	**Circle Name**	**AIRCEL**	**AIRTEL**	**MTNL**	**IDEA**	**RCOM (GSM)**	**VODAFONE**	**MTS**	**RCOM (CDMA)**	**TATA (CDMA)**
S/N	**Name of Parameter**			GSM Operators						CDMA Operators		
	Response time to customers for assistance											
1	Total no of calls attempted to customer care/Call center		Delhi	683480	107394	41574	536185	669315	1005430	98967	105344	17775
	Total no. of calls successfully established to customer care/Call center		Delhi	675104	107394	39987	518746	656124	1005430	98427	103452	17703
	% Accessibility of Call centre /customer Care (Total Calls successfully established*100/ Total call attempts)	>=95%	Delhi	98.77%	100.00%	96.18%	96.75%	98.03%	100.00%	99.45%	98.20%	99.59%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Delhi	139824	287176	25155	213058	71369	308998	37674	18058	231933
2	Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		Delhi	135046	265339	24988	212959	65707	304223	35592	17360	231910
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60/90 Sec .* 100 / Total call attempts)	>=90% (60 Sec.) & >=95% (90 Sec.)	Delhi	96.58%	***92.40%**	99.34%	99.95%	***92.07%**	*98.45%	94.47%	*96.13%	*99.99%

*Call answered by operators (voice to voice) in 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21st August 2014.

KEY FINDINGS*:*

1. *Metering and billing credibility-(Post paid & Pre-paid)*

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid is well within the prescribed bench mark of <=0.1 %. Only **RCOM (GSM)** and **RCOM (CDMA)** failed to meet the benchmark of **"% billing complaints – Prepaid'** with their performance as **0.30% and 0.11%** respectively.

2. *Resolution of Billing complaints and applying credits -*

    i.   *Resolution of billing /charging complaints*

    ii.   *Period of applying credit/waiver/adjustment to customer's account from the date of resolution of complaints*

All operators have 100% resolved the billing complaints within stipulated period of 4 weeks and also have met the benchmark of 100% refund in one week where customers were due for credit / adjustment. However, **Airtel** remained under performed for the parameter **"Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints"** with its performance value as **99.93%** marginally below the benchmark of 100%.

3. *Response Time to the Customer for assistance*

    i.   Accessibility of call centre/customer care
    ii.   Percentage of calls answered by Operators (Voice to Voice)

All service providers are in compliance with respect to the parameter accessibility of call center. However, **Airtel & RCOM (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within **90 seconds** as they provided the data for 90 seconds. They have achieved their performance as **94.73% and 94.45%** respectively against the benchmark of >=95%.
.

4. *Termination/Closure of Service*

In case of this parameters also, all service providers **(except Aircel and Vodafone)** have settled the 'closure/termination' within the benchmark of 7 days. **Aircel** and **Vodafone** could settle **99.74% and 96.99%** cases of closure.

5. *Time Taken for Refund of deposits after closures*

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure **except Airtel, Idea**, **MTS and Tata CDMA**. The performance of **Airtel, Idea, MTS and Tata CDMA** was **99.98%, 96.37%, 0.00% and 99.93%** respectively**. MTS** was failed to settle even a single case of refund out of 8 cases due for refund.

Live Measurements

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center 'and 'calls connection to operators (Voice to voice) within 60 seconds'. However, **Airtel & RCOM (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within **90 seconds** as they provided the data for 90 seconds. They have achieved their performance as **92.40% and 92.07%** respectively against the benchmark of >=95%.

6. LIVE CALLING ASSESSMENT

6) LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Delhi Metro service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT									
Calling Operators	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	MTS	VODAFONE
AIRCEL	Delhi	----	100.00%	92.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
AIRTEL	Delhi	100.00%	----	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MTNL	Delhi	90.00%	100.00%	----	100.00%	90.00%	100.00%	100.00%	100.00%	100.00%
IDEA	Delhi	100.00%	100.00%	100.00%	----	100.00%	100.00%	100.00%	100.00%	100.00%
RCOM GSM	Delhi	100.00%	100.00%	100.00%	100.00%	----	100.00%	90.00%	100.00%	100.00%
RCOM CDMA	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	----	100.00%	100.00%	100.00%
TATA CDMA	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	----	100.00%	100.00%
MTS	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	----	100.00%
VODAFONE	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	----

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, when Calls attempted from Aircel to MTNL, the interconnection was 92% successful, MTNL to Aircel and RCOM GSM was 90%, RCOM (GSM) to Tata (CDMA), it was (90%). Thus there was no much problem in interconnection from one operator to other operators.

6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE										
Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Delhi	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	Delhi	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Delhi	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total calls successfully established * 100 / Total call attempts)	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Delhi	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	Delhi	100*	95*	96*	100*	98*	100*	100*	97*	98*
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total calls attempts)	Delhi	100.00%	95.00%	96.00%	100.00%	98.00%	100.00%	100.00%	97.00%	98.00%

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, Airtel, MTNL, RCOM (GSM), RCOM (CDMA) and Tata (CDMA) could connect 95%, 96%, 98%, 97% and 98% of calls to the operator within 60 Seconds.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

PERFORMANCE (LIVE CALLING FOR BILLING COMPLAINTS)										
Parameter	Circle Name	AIRCEL	AIRTEL	MTNL	IDEA	RCOM (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Delhi	5	100	100	100	100	100	100	100	100
Total No. of calls Answered	Delhi	5	80	64	74	69	82	71	69	84
Cases resolved within 4 weeks	Delhi	5	80	64	74	69	82	71	69	84
%age of cases resolved	Delhi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling number of customers. During live calling, some of the customers did not attend the calls while few others reported that they don't exactly remember about the resolution of complaints. Majority of the customers reported that the billing complaints were resolved to their satisfaction.

6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING													
Emergency no.	Circle Name	SSA Name	Name of SDCA	No. of calls made	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	RCOM CDMA	TATA CDMA	MTS	VODAFONE
100	Delhi	NDMC Area	NA	4	√	√	√	√	√	√	√	√	√
101			NA	7	√	√	√	√	√	√	√	√	√
102			NA	7	√	√	√	√	√	√	√	√	√
1098			NA	7	X	√	√	√	√	√	√	√	√
1091 & 1291			NA	10	√	√	√	√	√	√	√	√	√
1070			NA	8	√	√	√	√	X	X	√	√	√
181			NA	7	√	√	√	√	√	√	√	√	√
100	Delhi	East Delhi	NA	4	√	√	√	√	√	√	√	√	√
101			NA	7	√	√	√	√	√	√	√	√	√
102			NA	7	√	√	√	√	√	√	√	√	√
1098			NA	7	X	√	√	√	√	√	√	√	√
1091 & 1291			NA	10	√	√	√	√	√	√	√	√	√
1070			NA	8	√	√	√	√	X	X	√	√	√
181			NA	7	√	√	√	√	√	√	√	√	√
100	Delhi	Gurgaon & Faridabad	NA	4	√	√	√	√	√	√	√	√	√
101			NA	7	√	√	√	√	√	√	√	√	√
102			NA	7	√	√	√	√	√	√	√	√	√
1098			NA	7	X	√	√	√	√	√	√	√	√
1091 & 1291			NA	10	√	√	√	√	√	√	√	√	√
1070			NA	8	√	√	√	√	X	X	√	√	X
181			NA	7	√	√	√	√	√	√	√	√	√

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, a number of calls were made from mobile phones provided by them during the drive test. In Delhi Metro service area, these services were found functional in the networks of all the service providers. However, the services 1098 and 1070 were not found functional for Aircel, RCOM (GSM), RCOM (CDMA) and Vodafone at some of the places as mentioned in the table above.

7. DRIVE TEST

7) OPERATOR ASSISTED DRIVE TEST

In terms of TRAI's letter dated 21st January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **North Delhi & NDMC Area, East Delhi (Municipal Area) and Gurgaon & Faridabad** in the months of July, August and September 2014 respectively, the total route Kms covered during the drive tests in respective SSAs was **351 Kms, 293 Kms and 313 Kms** respectively. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4% FER value for CDMA operators is considered to be good, where as Rx Qual beyond this benchmark is considered to be bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in dBm at street level with strength ≥ -75 dBm for in-door coverage and ≥ -85 dBm for in-vehicle.

7.1 OPERATOR ASSISTED DRIVE TEST: NORTH DELHI & NDMC AREA (JULY-14)

DRIVE TEST TABLE: 1

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Major Roads	267	30	204	31	228	37	239	30	249	30	237	30	241	30	264	30	251	31
		Highways	9	30	44	30	11	30	9	30	13	38	15	31	22	30	14	30	10	32
		Within City	165	30	174	31	184	33	187	30	233	29	165	32	174	30	178	30	174	30
		Overall SSA	**441**	**90**	**422**	**92**	**423**	**100**	**435**	**90**	**495**	**97**	**417**	**93**	**437**	**90**	**456**	**90**	**435**	**93**
2	Blocked Call Rate	Major Roads	2.62%	0.00%	1.47%	0.00%	2.63%	0.00%	0.42%	0.00%	0.40%	0.00%	0.42%	0.00%	0.41%	0.00%	0.00%	0.00%	0.40%	0.00%
		Highways	0.00%	0.00%	2.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.55%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	1.21%	0.00%	1.72%	0.00%	8.15%	0.00%	2.67%	0.00%	1.72%	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	1.15%	3.33%
		Overall SSA	**2.04%**	**0.00%**	**1.66%**	**0.00%**	**4.96%**	**0.00%**	**1.38%**	**0.00%**	**1.01%**	**0.00%**	**0.48%**	**0.00%**	**0.46%**	**0.00%**	**0.00%**	**0.00%**	**0.69%**	**1.08%**
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	3.96%	0.00%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.76%	0.00%	1.60%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.62%	0.00%	0.00%	0.00%	7.79%	3.33%	1.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.12%	0.00%	0.00%	0.00%
		Overall SSA	**0.23%**	**0.00%**	**0.00%**	**0.00%**	**5.45%**	**1.05%**	**0.47%**	**0.00%**	**2.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.88%**	**0.00%**	**0.93%**	**0.00%**
4	Percentage connections with good voice quality (=>95%)																			
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.68%	100%	93.31%	93.71%	94.33%	99.72%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.10%	99.84%	96.58%	100%	98.24%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.80%	100%	96.08%	99.67%	95.32%	100%
		Overall SSA	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**97.95%**	**99.95%**	**94.47%**	**99.41%**	**94.82%**	**99.91%**
	(b) 0-5 (with frequency hopping for	Major Roads	90.58%	98.85%	95.15%	98.79%	94.74%	99.26%	92.52%	96.78%	93.39%	99.23%	96.08%	96.39%	NA	NA	NA	NA	NA	NA
		Highways	88.88%	94.52%	94.51%	95.27%	96.62%	99.33%	89.68%	98.90%	91.12%	99.35%	95.74%	99.05%	NA	NA	NA	NA	NA	NA

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
	GSM Operators)	Within City	88.72%	93.83%	95.44%	96.90%	93.11%	94.28%	92.54%	96.52%	91.77%	96.54%	95.44%	98.27%	NA	NA	NA	NA	NA	NA
		Overall SSA	89.85%	95.77%	95.21%	95.72%	94.12%	97.68%	92.48%	97.27%	92.60%	98.44%	95.82%	98.02%	NA	NA	NA	NA	NA	NA
	Service Coverage																			
	In door (>= -75dBm)	Major Roads	76.49%	100%	95.68%	99.11%	36.71%	69.40%	38.48%	51.17%	67.21%	100%	92.07%	97.20%	82.23%	98.24%	79.21%	98.30%	76.82%	99.99%
		Highways	84.66%	99.98%	96.73%	90.65%	51.70%	31.40%	40.70%	21.82%	74.62%	100%	97.08%	99.12%	29.13%	88.55%	74.94%	98.93%	68.69%	83.59%
		Within City	75.20%	98.90%	96.55%	99.50%	29.35%	4.70%	36.42%	57.91%	72.51%	89.41%	96.07%	100%	82.16%	99.09%	81.84%	100%	78.05%	100%
		Overall SSA	76.17%	99.64%	96.12%	92.02%	34.06%	36.67%	37.67%	45.52%	69.82%	96.72%	93.76%	98.90%	97.70%	95.29%	80.04%	98.50%	77.13%	93.97%
5	In-vehicle (>= -85dBm)	Major Roads	95.91%	100%	98.84%	100%	79.78%	95.92%	87.34%	97.54%	90.34%	100%	98.14%	99.30%	98.76%	99.79%	99.39%	100%	93.65%	100%
		Highways	97.93%	100%	99.54%	98.56%	89.24%	78.89%	81.95%	92.04%	94.36%	100%	99.74%	99.89%	98.15%	99.08%	95.84%	99.54%	93.04%	100%
		Within City	93.52%	99.44%	99.26%	100%	71.87%	76.54%	87.80%	98.46%	95.77%	99.49%	99.46%	100%	98.03%	99.68%	99.72%	100%	98.38%	100%
		Overall SSA	95.06%	99.82%	99.07%	98.79%	76.73%	84.36%	87.44%	96.36%	92.93%	99.84%	98.70%	99.77%	98.44%	99.52%	99.39%	99.96%	95.57%	100%
	Outdoor- in city (>= -95dBm)	Major Roads	99.23%	100%	99.57%	100%	98.18%	99.90%	99.38%	99.98%	100%	100%	99.23%	99.66%	100%	100%	100%	100%	99.83%	100%
		Highways	99.00%	100%	99.87%	99.60%	98.81%	99.72%	98.65%	99.86%	100%	100%	100%	100%	100%	100%	100%	100%	99.00%	100%
		Within City	98.88%	99.78%	99.81%	100%	98.14%	99.52%	99.29%	100%	100%	100%	99.84%	100%	100%	100%	100%	100%	99.97%	100%
		Overall SSA	99.09%	99.93%	99.69%	99.66%	98.18%	99.72%	99.33%	99.95%	100%	100%	99.49%	99.91%	100%	100%	100%	100%	99.87%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	97.38%	100%	98.53%	100%	88.60%	94.59%	99.58%	100%	99.60%	100%	99.58%	100%	99.59%	100%	100%	100%	99.60%	100%
		Highways	100%	100%	97.73%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95.45%	100%	100%	100%	100%	100%
		Within City	98.18%	100%	97.70%	100%	83.70%	90.91%	97.33%	100%	98.28%	100%	99.39%	100%	100%	100%	100%	100%	98.85%	96.67%
		Overall SSA	97.73%	100%	98.10%	100%	86.76%	95.00%	98.62%	100%	98.99%	100%	99.52%	100%	99.54%	100%	100%	100%	99.31%	98.92%
7	Hand Over Success Rate (HOSR)	Major Roads	97.97%	100%	98.26%	100%	93.47%	100%	99.78%	100%	99.01%	100%	99.79%	100%	100%	100%	100%	100%	100%	100%
		Highways	91.30%	100%	99.04%	100%	100%	100%	100%	100%	100%	100%	96.55%	100%	100%	100%	100%	100%	100%	100%

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
		Within City	99.24%	100%	98.57%	100%	90.63%	72.86%	98.47%	93.55%	98.03%	100%	99.14%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.24%	100%	98.48%	100%	92.39%	87.66%	99.24%	95.65%	98.58%	100%	99.42%	100%	100%	100%	100%	100%	100%	100%

NA-Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

7.2 OPERATOR ASSISTED DRIVE TEST: EAST DELHI (MUNICIPAL AREA) – AUGUST 14

DRIVE TEST TABLE: 2

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
1	Call Attempts	Major Roads	172	30	176	30	208	35	170	30	160	30	174	30	202	30	190	30	168	30
		Highways	33	30	27	33	34	29	41	30	19	30	26	30	35	30	28	31	24	30
		Within City	259	30	261	31	253	30	235	30	270	34	265	30	265	30	250	30	236	31
		Overall SSA	**464**	**90**	**464**	**94**	**495**	**94**	**446**	**90**	**449**	**94**	**465**	**90**	**502**	**90**	**468**	**91**	**428**	**91**
2	Blocked Call Rate	Major Roads	1.16%	0.00%	1.70%	0.00%	6.73%	0.00%	0.00%	0.00%	4.38%	0.00%	1.15%	0.00%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	2.94%	0.00%	2.24%	0.00%	5.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	1.16%	0.00%	0.00%	0.00%	3.95%	0.00%	0.85%	0.00%	1.11%	0.00%	0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.85%	3.23%
		Overall SSA	**1.08%**	**0.00%**	**0.65%**	**0.00%**	**5.05%**	**0.00%**	**0.67%**	**0.00%**	**2.45%**	**0.00%**	**0.43%**	**0.00%**	**0.80%**	**0.00%**	**0.00%**	**0.00%**	**0.47%**	**1.10%**
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	16.48%	3.45%	0.00%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	3.68%	0.00%	0.60%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	3.23%	6.90%	0.00%	0.00%	5.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	1.18%	0.00%	0.00%	0.00%	11.79%	0.00%	0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	0.43%	0.00%
		Overall SSA	**0.66%**	**0.00%**	**0.00%**	**0.00%**	**13.12%**	**3.45%**	**0.00%**	**0.00%**	**0.91%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.92%**	**0.00%**	**0.47%**	**0.00%**
4	**Percentage connections with good voice quality (=>95%)**																			
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.19%	99.90%	92.72%	97.66%	97.45%	98.12%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.36%	99.64%	93.76%	99.05%	94.63%	99.60%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.44%	100%	94.48%	95.11%	95.41%	98.57%
		Overall SSA	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**96.67%**	**99.85%**	**93.79%**	**96.88%**	**96.17%**	**98.76%**
	(b) 0-5 (with frequency hopping for	Major Roads	88.24%	97.99%	95.56%	96.26%	93.19%	98.58%	91.31%	95.01%	89.87%	95.91%	96.91%	97.26%	NA	NA	NA	NA	NA	NA
		Highways	91.51%	97.60%	93.59%	93.86%	95.83%	96.53%	88.61%	91.79%	85.33%	83.55%	97.45%	98.99%	NA	NA	NA	NA	NA	NA

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	GSM Operators)	Within City	89.02%	97.52%	95.35%	98.18%	94.18%	94.89%	91.20%	95.32%	92.41%	99.27%	97.08%	99.28%	NA	NA	NA	NA	NA	NA
		Overall SSA	88.90%	97.71%	95.31%	96.33%	93.92%	96.71%	91.03%	94.03%	91.19%	93.39%	97.04%	98.51%	NA	NA	NA	NA	NA	NA
	Service Coverage																			
	In door (>= -75dBm)	Major Roads	87.29%	100%	97.66%	99.89%	33.59%	46.60%	61.64%	91.65%	90.18%	98.38%	98.14%	100%	99.64%	100%	91.14%	100%	89.27%	100%
		Highways	93.27%	96.64%	97.52%	100%	34.40%	33.60%	65.04%	76.68%	80.18%	97.11%	97.22%	100%	98.90%	100%	99.06%	100%	98.36%	99.81%
		Within City	74.28%	100%	95.21%	100%	25.41%	31.20%	42.08%	8.17%	81.57%	99.89%	96.17%	100%	96.43%	100%	77.92%	97.61%	82.99%	99.67%
		Overall SSA	79.89%	98.88%	96.27%	99.96%	29.34%	37.36%	51.54%	58.53%	84.36%	98.49%	96.97%	100%	97.88%	100%	84.23%	99.20%	86.35%	99.82%
5	In-vehicle (>= -85dBm)	Major Roads	97.17%	100%	98.84%	100%	80.56%	86.60%	96.17%	99.91%	98.87%	100%	99.54%	100%	100%	100%	99.73%	100%	99.37%	100%
		Highways	97.07%	99.84%	98.97%	100%	87.55%	82.90%	96.67%	99.82%	97.46%	99.78%	99.40%	100%	100%	100%	100%	100%	99.97%	99.94%
		Within City	97.29%	100%	99.06%	100%	77.95%	88.40%	91.91%	95.89%	97.96%	100%	99.74%	100%	100%	100%	99.41%	100%	99.22%	99.98%
		Overall SSA	97.23%	99.95%	98.97%	100%	79.72%	86.05%	93.95%	98.52%	98.24%	99.93%	99.65%	100%	100%	100%	99.57%	100%	99.32%	99.97%
	Outdoor- in city (>= -95dBm)	Major Roads	98.93%	100%	99.53%	100%	97.78%	99.30%	99.89%	100%	100%	100%	99.86%	100%	100%	100%	100%	100%	99.98%	100%
		Highways	99.55%	100%	99.62%	100%	99.60%	99.80%	99.90%	100%	100%	100%	99.84%	100%	100%	100%	100%	100%	100%	100%
		Within City	99.47%	100%	99.72%	100%	98.63%	99.80%	99.81%	100%	100%	100%	99.94%	100%	100%	100%	100%	100%	99.97%	100%
		Overall SSA	99.28%	100%	99.64%	100%	98.36%	99.62%	99.85%	100%	100%	100%	99.91%	100%	100%	100%	100%	100%	99.97%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	98.84%	100%	97.16%	100%	87.50%	82.86%	100%	100%	95.63%	100%	98.85%	100%	99.01%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	91.18%	100%	97.56%	100%	94.74%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	98.07%	100%	99.23%	100%	90.51%	96.67%	99.15%	100%	98.89%	100%	100%	100%	99.25%	100%	100%	100%	99.15%	96.77%
		Overall SSA	98.49%	100%	98.49%	100%	89.29%	92.55%	99.33%	100%	97.55%	100%	99.57%	100%	99.20%	100%	100%	100%	99.53%	98.90%
7	Hand Over Success Rate (HOSR)	Major Roads	97.37%	100%	97.73%	100%	82.82%	100%	99.67%	100%	97.10%	100%	99.69%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	95.00%	100%	99.12%	100%	91.18%	95.29%	99.07%	100%	100%	100%	100%	100%	100%	100%

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
		Within City	99.16%	100%	97.15%	100%	90.39%	100%	99.54%	100%	97.58%	100%	99.47%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	98.56%	100%	97.66%	100%	88.14%	100%	99.53%	100%	97.06%	97.04%	99.53%	100%	100%	100%	100%	100%	100%	100%

NA-Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour.

7.3 OPERATOR ASSISTED DRIVE TEST: GURGAON & FARIDABAD AREA (SEPTEMBER 14)

DRIVE TEST TABLE: 3

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
1	Call Attempts	Major Roads	152	20	175	20	132	20	160	20	133	21	164	20	173	20	150	20	149	21
		Highways	101	11	88	10	88	11	106	10	100	10	93	10	92	10	78	10	96	10
		Within City	253	20	219	20	215	23	247	20	259	24	234	21	271	20	265	20	259	20
		Overall SSA	**506**	**51**	**482**	**50**	**435**	**54**	**513**	**50**	**492**	**55**	**491**	**51**	**536**	**50**	**493**	**50**	**504**	**51**
2	Blocked Call Rate	Major Roads	1.32%	0.00%	1.71%	0.00%	6.06%	0.00%	0.00%	0.00%	1.50%	0.00%	1.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	1.14%	0.00%	4.55%	9.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.09%	0.00%	0.00%	0.00%	1.04%	0.00%
		Within City	0.00%	0.00%	1.83%	0.00%	4.19%	0.00%	1.21%	0.00%	2.70%	16.67%	0.43%	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	**0.40%**	**0.00%**	**1.66%**	**0.00%**	**4.83%**	**1.85%**	**0.58%**	**0.00%**	**1.83%**	**7.27%**	**0.81%**	**0.00%**	**0.56%**	**0.00%**	**0.00%**	**0.00%**	**0.20%**	**0.00%**
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	5.00%	0.00%	0.00%	0.00%	0.76%	0.00%	0.00%	0.00%	0.00%	0.00%	1.33%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	2.44%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.05%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	6.34%	0.00%	0.00%	0.00%	0.00%	5.00%	0.00%	0.00%	0.00%	0.00%	1.13%	0.00%	0.39%	0.00%
		Overall SSA	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**5.16%**	**1.89%**	**0.00%**	**0.00%**	**0.21%**	**1.96%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.01%**	**0.00%**	**0.40%**	**0.00%**
4	Percentage connections with good voice quality (=>95%)																			
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.92%	99.98%	96.98%	96.86%	96.45%	99.77%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.71%	99.74%	97.32%	97.67%	97.76%	99.87%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.32%	99.87%	96.34%	100%	98.62%	99.94%
		Overall SSA	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**99.09%**	**99.89%**	**96.72%**	**97.46%**	**97.83%**	**99.86%**
	(b) 0-5 (with frequency hopping for	Major Roads	92.49%	95.45%	95.44%	98.99%	93.95%	92.62%	91.56%	91.33%	93.57%	98.57%	96.35%	98.92%	NA	NA	NA	NA	NA	NA
		Highways	94.73%	99.09%	94.39%	97.42%	95.45%	88.32%	88.59%	92.18%	96.32%	93.76%	96.32%	97.37%	NA	NA	NA	NA	NA	NA

S/N	Parameter	Classification of routes covered	AIRCEL OUTDOOR	AIRCEL INDOOR	AIRTEL OUTDOOR	AIRTEL INDOOR	MTNL OUTDOOR	MTNL INDOOR	IDEA OUTDOOR	IDEA INDOOR	RCOM GSM OUTDOOR	RCOM GSM INDOOR	VODAFONE OUTDOOR	VODAFONE INDOOR	MTS OUTDOOR	MTS INDOOR	RCOM CDMA OUTDOOR	RCOM CDMA INDOOR	TATA CDMA OUTDOOR	TATA CDMA INDOOR
	GSM Operators)	Within City	93.28%	99.15%	96.12%	99.14%	94.58%	95.71%	92.87%	92.00%	92.97%	90.61%	96.96%	96.06%	NA	NA	NA	NA	NA	NA
		Overall SSA	93.32%	97.66%	95.57%	98.71%	94.58%	93.12%	91.58%	91.77%	93.86%	94.77%	96.64%	98.43%	NA	NA	NA	NA	NA	NA
	Service Coverage																			
	In door (>= -75dBm)	Major Roads	81.30%	70.20%	95.13%	99.76%	21.20%	0.39%	62.99%	67.48%	59.09%	99.25%	92.85%	100%	75.42%	84.27%	78.77%	86.76%	73.20%	80.94%
		Highways	90.97%	94.18%	95.84%	99.41%	40.84%	1.21%	87.57%	71.84%	78.83%	98.52%	92.09%	100%	95.48%	41.10%	84.13%	96.25%	96.08%	100%
		Within City	92.13%	89.77%	96.86%	100%	19.72%	6.79%	74.00%	57.69%	62.63%	72.35%	97.35%	100%	91.15%	52.16%	85.03%	100%	92.75%	100%
		Overall SSA	88.59%	82.83%	96.01%	99.80%	24.31%	3.31%	73.22%	64.40%	65.12%	83.43%	94.88%	100%	87.03%	63.20%	82.72%	93.92%	87.72%	92.33%
5	In-vehicle (>= -85dBm)	Major Roads	93.22%	99.82%	99.19%	100%	71.80%	67.38%	95.18%	98.67%	89.12%	100%	98.94%	100%	97.26%	100%	96.38%	99.99%	92.03%	100%
		Highways	98.87%	100%	98.71%	99.55%	81.86%	86.12%	98.88%	99.80%	96.86%	100%	99.32%	100%	99.96%	100%	99.50%	100%	99.94%	100%
		Within City	98.54%	99.67%	99.16%	100%	74.88%	83.04%	98.69%	97.76%	90.18%	96.05%	99.58%	100%	100%	100%	99.77%	100%	99.73%	100%
		Overall SSA	96.98%	99.79%	99.09%	99.90%	75.35%	77.77%	97.60%	98.53%	91.31%	97.69%	99.31%	100%	99.15%	100%	98.56%	100%	97.55%	100%
	Outdoor- in city (>= -95dBm)	Major Roads	98.97%	100%	99.76%	100%	97.65%	99.29%	99.75%	100%	100%	100%	99.74%	100%	100%	100%	99.59%	100%	99.25%	100%
		Highways	99.73%	100%	99.46%	99.55%	97.86%	100%	99.98%	100%	100%	100%	99.81%	100%	100%	100%	100%	100%	99.99%	100%
		Within City	99.67%	99.98%	99.67%	99.55%	98.12%	100%	99.97%	100%	100%	100%	99.90%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	99.47%	99.99%	99.67%	99.90%	97.93%	99.34%	99.90%	99.95%	100%	100%	99.83%	100%	100%	100%	99.86%	100%	99.78%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	98.03%	100%	97.14%	100%	90.91%	100%	100%	100%	98.50%	100%	98.17%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	97.73%	100%	93.18%	90.91%	100%	100%	100%	100%	100%	100%	98.91%	100%	100%	100%	98.96%	100%
		Within City	100%	100%	97.26%	100%	95.35%	100%	98.79%	100%	97.30%	83.33%	99.57%	100%	99.26%	100%	100%	100%	100%	100%
		Overall SSA	99.41%	100%	97.30%	100%	93.56%	98.15%	99.42%	100%	98.17%	92.73%	99.19%	100%	99.44%	100%	100%	100%	99.80%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	98.37%	100%	97.96%	100%	88.75%	96.55%	100%	100%	98.34%	100%	99.07%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	98.26%	100%	86.67%	95.00%	100%	100%	98.84%	79.25%	98.74%	100%	100%	100%	100%	100%	100%	100%

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		MTNL		IDEA		RCOM GSM		VODAFONE		MTS		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
		Within City	99.32%	100%	98.63%	100%	93.27%	100%	99.05%	100%	97.73%	80.00%	99.34%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	99.09%	100%	98.32%	100%	90.72%	96.77%	99.60%	100%	98.09%	81.68%	99.14%	100%	100%	100%	100%	100%	100%	100%

NA-Not Applicable

The service providers having block call rate more than 3% have been shaded in yellow colour

7.4 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
North Delhi (NDMC)	**July-14**	NDMC / **101KM**	Khan Market, Barakhanba Road, CP Central Park, Aulia Masjid, Minto Road, Delhi Gate, Dariya Ganj, Shanti Van, ITO, New Delhi Railway Station, Pahar Ganj, Jhanda Valan, Karolbagh, Tal Katora Stadium, RML Hospital, Gole Market, Ashoka Road, Bangla Sahib, 7 Akbar Road, Hotel Taj, Embassy of Palestine, Sarojni Nagar, Lodhi Road, CBI Office, Mathura Road, NFC, Maharani Bagh, Kashmiri Gate. **INDOOR**: Southsquare Mall, Haldiram	NDMC/ **120KM**	Kahmiri Gate, Civil Lines, Vidhan Sabha, GTB Nagar, Model Town, Azadpur Mandi, Jahangirpuri, Mukraba Chowk, Sant Nagar (Burari), Baktawarpur, Swaroop Nagar, Karnal Highway, Singhu Border, Narela, Bawana, Pooth Khurd, Barwala Village, Prahladpur, Sahbad Dairy, Burari Bypass, Nigambodh Ghat. **INDOOR**: ISBT Kasmiri Gate, Pizza Bite.	NDMC/ **130KM**	Kashmiri Gate, Tees Hazari, Azad Market, Kishan Ganj, Sarai Rohilla, Sahzabad Bagh, Punjabi Bagh, Paschim Vihar, Nangloi, Mundka, Rajiv Nagar, Karala, Ladpur, Vajidpur, Dariyapur Kalan, Begumpur, Rohini, Mangolpuri, Pitampura, Shalimar Bagh, Azadpur Mandi, GTB Nagar. **INDOOR**: Ring Road Mall, M2K.
East Delhi	**Aug-14**	East Delhi / **102KM**	Dilshad Garden, Dilshad Colony, Seemapuri Old, Tahirpur, GTB Enclave, GTB Hospital, Sundar Nagar, Nand Nagri, Kabeer Nagar, Yamuna Vihar, Maujpur, New Seelampur, Jafrabad, Shadra, Loni Road, Karawal Nagar, Pusta Road, Chandbagh, Shastri Park, Dilshad Garden. **INDOOR**: Dilshad Garden Metro.	East Delhi / **95KM**	Akshardham, Yamuna Bank, Gandhi Nagar Market, Nirman Vihar, Preet Vihar, Karkardooma, Vikas Marg, Viswas Nagar, Vivek Vihar, Saini Enclave, Yojna Vihar, Srestha Vihar, Soorajmal Vihar, Hargobind Enclave, Anand Vihar, Dilshad Garden, Akshardham. **INDOOR**: Aggarwal Fun City Mall, Metro Whole.	East Delhi/ **96KM**	Akshardham, Ganesh Nagar, Laxmi Nagar, Angad Nagar, Khureji Khas, Geeta Colony, Pusta Road, Mayur Vihar, Patpadganj, Mandawale, Kotlagaon, Gazipur, Mayur Vihar, Chilla Sport Complex, Dallupura, Kondli, Trilokpuri, NH-24, Akshardham. **INDOOR**: EDM Mall, Bikaner

DRIVE TEST ROUTE OF JULY TO SEPTEMBER 14 – DELHI METRO CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
Gurgaon and Faridabad	Sep-14	Faridabad / **103KM**	Badarpur Border, Barkhal Chowk, Old Faridabad Chowk, Ballabhgarh Busstand, Sanjay Colony, New Press Colony, Bhagat Singh Chowk, Railway Road, Gandhi Colony, Sec-21, Sec-45, Laxmi Narayan mandir, Green Field Colony, NHPC, Sec-33, Sec-14,15,16, Old Faridabad Market. **INDOOR**: Reliance Mall, SRS Mall, Faridabad	Gurgaon/ **107KM**	Gurudronacharya, Sikandarpur, Sec-56, Sec-51, Samaspur, Sec-46, Jharsa, Mohiyalal Colony, Sec-31,32, Sohna Road, Khirki Dola, Darbaripur, Maesar Toll, Manesar, Honda Chowk, Rajiv Chowk, Udyog Vihar, DLF City Phase-2, Iffco Chowk, Sikandarpur, DLF City Phase-1, Ambedkar Chowk, Huda City Center. **INDOOR**: MGF City Mall, Gurgaon	Gurgaon/ **103KM**	Gurudronacharya, Ghoda Chowk, Old Delhi Road, Fountain Chowk, New Railway Road, Surya Vihar, Firozgandhi Colony, Basai Gaon, Veer Nagar, Sadar, Rajendra Park, Bajgerha Road, Ashok Vihar, Sec-5, Maruti, GGN PH-2, TCS, TUV, Sec-17, Sahara Mall. **INDOOR**: Sahara Mall, Haldi Ram

7.5 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF NDMC AREA – JULY 14

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	NDMC Area	Poor Level & Quality near Shankar Rd, Upadhayay Rd, Zakir Hussain Rd, Lodhi Rd, Raiseena Rd	NDMC Area	Poor Level & Quality near Narela, Bawana	NDMC Area	Poor Level & Quality near Rohini Sec-24, Sec-3, Pithampura, Rohtak Rd, Pratap Nagar, Madanpur
2	AIRTEL		Poor Level & Quality near Pragati Maidan, Akbar Rd		Poor Level & Quality near Baktawarpur, Narela		----
3	MTNL		Poor Level & Quality near UP Bhawan, LNJP Hospital, Pragati Maidan		Poor Level & Quality near Bawana, Alipur, Civil Lines, Tigripur, Puth Khurd		Poor Level & Quality near Rohini Sec-9, Karala, Jatkhor
4	TATA CDMA		Poor Level & Quality near Embessay Area, Talkatora, Karol Bagh, New Delhi Rly Stn, Jhandewala, Pragati Maidan, CGO Complex, Palika Vihar, Malcha Marg		Poor Quality near Bawana, Bakhtawarpur, Burar, Majnu ka tila		Poor Quality near Bawana, Puth Khurd, Punjabi Bagh, lawrence Rd
5	IDEA		Poor Level & Quality near Ambedkar Stadium, Golf Course Rd, Indraprashtha, Maharani Bagh, Chamkyapuri, Tin Murti, Maurya Seraton, RML. Talkatora Stadium		Poor Level & Quality near Bhalswa Jahangirpuri, Bawana		Poor Level & Quality near Puth Khurd, Rohini Sec-17, Sec-24
6	RCOM GSM		Poor Level & Quality near Talkatora Stadium, Daryaganj, pataudi House, Nizamudin, Aliganj, Sarojini Nagar, CP, Maharani Bagh		Poor Level & Quality near Rohini Industrial Area, JJ Colony, Nathupura, GTB Nagar		Poor Level & Quality near Puth Khurd, Rohini Sec-24, Rajeev Nagar
7	RCOM CDMA		Poor Quality near Karol Bagh, Hotel Janpath, Veer Singh Marg, WHO office, Laxmi Bai Nagar,		Poor Quality near Bakhatawarpur		Poor Level & Quality near Nangalthakran, Model Town, Shahazadabagh
8	MTS		Poor Level near Sundar Nagar, Poor Quality near Kashmiri Gate, Pragati maidan, CP		Poor Quality near Vidhan Sabha		----
9	VODAFONE		----		----		----

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF EAST DELHI AREA (AUGUST-14)

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	East Delhi	Poor Level & Quality near Pushta Rd, Lal Bagh Colony, Loni Rd	East Delhi	Poor Level & Quality near Gandhi Nagar, Suraj Mal Marg, Anand Vihar, Preet Vihar Metro Stn	East Delhi	Poor Level & Quality near Karkari Mod Rd, Trilokpuri
2	AIRTEL		Poor Level & Quality near Tahirpur		Poor Level & Quality near Gandhi Nagar, Vikash Nagar, Akshardham		Poor Quality near Laxmi Nagar, Trilokpuri, Mayur Vihar
3	MTNL		Poor Level & Quality near Loni Rd, Shastri Park		Poor Level & Quality near Karkarduma, Gandhi Nagar		Poor Quality near mayur Vihar, Himmatpuri, Ganesh Nagar
4	TATA CDMA		Poor Quality near Lal Bagh, Loni Rd, GTB Enclave, Dilsad Colony, Shahadara, Subhash Park, Zero Pushta		Poor Level & Quality near Surajmal Vihar, Vishwas Nagar, DDA Flats Ram Vihar, Yojna Vihar and Poor Quality near Gandhi Nagar, Seelampur, Welcome, Madhu Vihar		Poor Level & Quality near Gazipur Landfill and Poor Quality near Shri Hanuman Marg, mandawali, Akshardham Bridge
5	IDEA		Poor Level & Quality near Welcome Metro Stn, Dilsad Garden		Poor Level & Quality near Preet Vihar, Vivek Vihar, Geeta Colony, Laxmi Nagar		Poor Level & Quality near Trilokpuri, Kalyanpuri, Mayur Vihar
6	RCOM GSM		Poor Level & Quality near Balrampur, Shastri Park, Dayalpur, Loni Rd, Shahdara, Jhilmil, Seelampur		Poor Level & Quality near Geeta Colony, Laxmi Nagar, Nirman Vihar and Poor Quality near Vishwas Nagar, Rampuri, Madhu Vihar		Poor Level & Quality near West Vinod Nagar, CWG Village, Laxmibai Nagar Ext, Himmatpuri, New Ashok Nagar, Nizamudin
7	RCOM CDMA		Poor Quality near Jyoti Nagar, Dilsad Colony, Mansarovar Park, Jafarbad		Poor Quality near Gandhi Nagar, Vivek Vihar		Poor Quality near Pratap Ganj Ext, Himmatpuri
8	MTS		Pooe Quality near Dilsan Garden, Kartar nagar, New Seelampuri		----		----
9	VODAFONE		Poor Quality near Dilsad Garden		Poor Quality near Karkarduma		----

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF GURGAON & FARIDABAD AREA – SEPTEMBER 14

S. NO	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Faridabad	Poor Level & Quality near Badkhal Chowk, Sanjay Colony, Friens Colony, NHPC Colony	Gurgaon	Poor Level & Quality near Sohna Rd, Hasanpur	Gurgaon	Poor Level & Quality near Palam Vihar, Gurgaon PH-2, Ghoda Chowk
2	AIRTEL		Poor Quality patches near Sec-21		Poor Level & Quality nea rSec-51, 56, 46, Sushant Lok, Badshahpur		Poor Quality near Sikandarpur
3	MTNL		Poor Level & Quality near Badkhal Chowk, Sanjay Colony		Poor Leveel & Quality near Udhyog Vihar PH-5, Sec-15, DLF PH-1, Sushant Lok, Sohna Rd		Poor Level & Quality near Udhyog Vihar PH-5, Palam Vihar, Sec-4
4	TATA CDMA		Poor Level near Badkhal Chowk, Sec-21, Sanjay Colony		Poor Level & Quality near Sec-43, Rajeev Chowk, Sohna Rd		Poor Quality near Ashok vihar PH-2, Old Delhi Rd
5	IDEA		Poor Level & Quality near Sec-21, Sec-43, NHPC Colony		Poor Level & Quality near Hasanpur, Nathupur		Poor Quality near Udhyog Vihar, Sukhrali
6	RCOM GSM		Poor Level & Quality near Badkhal Chowk, NHPC Colony, Sanjay Colony, Poor Quality near Sec-35, Prem Colony, Parsvanath City mall, NIT Faridabad, East India Chowk		Poor Level & Quality near Malikhera, Kherhidaula, Poor Quality near Sarhaul, Essel Tower, Sushant Lok-1		Poor Level & Quality near Sukhrali, Sarhaul Abadi, Sec-18
7	RCOM CDMA		Poor Level & Quality near Badkhal Chowk, Faridabad Sec-27, Sec-15		Poor Level & Quality near Badshahpur and Poor Quality near Udhyog Vihar PH-5		Poor Quality near Molhera, Sarhaul Sec-18
8	MTS		Poor Level & Quality near Sec-21		Poor Level & Quality near Khedkidaula, Rampura Manesar		Poor Level & Quality near Gurgaon Sec-18
9	VODAFONE		----		----		Poor Level & Quality near Ghoda Chowk

7.6 KEY FINDINGS ON DRIVE TEST:

The drive tests conducted in different routes of Delhi/NCR region such as **North Delhi & NDMC Area, East Delhi Municipal area,** and **Gurgaon / Faridabad** given above in table-4, during three months of the quarter ended September 2014 revealed that the performance of some of the service providers was not satisfactory as they remained non-compliant of different parameters in different areas of Delhi/NCR. The **overall non-compliance of the service providers on SSA level** with respect to the different parameters is summarized as follows:

July-2014: (North Delhi & NDMC))

1. **MTNL:** Call Drop Rate: **5.45%** (Outdoor), Voice Quality: **94.12%** (Outdoor), Call Setup success rate (CSSR): **86.76%** and Blocked call rate: **4.96%**.

2. **Aircel, Idea, RCOM (GSM), RCOM (CDMA) and Tata (CDMA):** Remained under performed for parameter Voice Quality with their performance as **89.85%, 92.48%, 92.60%, 94.47% and 94.82%** respectively.

August-2014 (East Delhi Municipal Area)

1. **MTNL:** Call Drop rate: **13.12%** (Outdoor) / **3.45%** (Indoor), Voice Quality: **93.92%** CSSR: **89.29%** (outdoor) / **92.55%** (Indoor) and Blocked Call rate: **5.05%**.

2. **Aircel, Idea, RCOM (GSM)** and **RCOM (CDMA)** Remained under performed for parameter Voice Quality with their performance as **88.90%, 91.03%** (Outdoor) **/ 94.03%** (Indoor), **91.19%** (Outdoor) **/ 93.39%** (Indoor) and **93.79%** respectively.

September -2014 (Gurgaon / Faridabad) :

1. **MTNL:** Call drop rate: **5.16%**, Voice Quality: **94.58%** (Outdoor) **/ 93.12%** (Indoor), CSSR: **93.56%** and Blocked Call rate: **4.83%**.

2. **Aircel and Idea** Remained under performed for parameter Voice Quality with their performance as **93.32%, 91.58%** (Outdoor) **/ 91.77%** (Indoor) respectively.

3. **RCOM (GSM) :** Voice Quality: **93.86%** (Outdoor) **/ 94.77%** (Indoor), CSSR**: 92.73%** (Indoor).

The deficiencies with respect to adequate coverage and voice quality, encountered during the drive tests for different Service providers at various places as shown in the drive tests plots, are detailed in the above drive test table.-5, 6 & 7.

From the above, it was concluded that the performance of the service providers with respect to the parameter 'Voice Quality' remained main area of concern as majority of operators failed to comply with its bench mark. However, apart from Voice Quality, MTNL remained non- compliant in respect of other parameters also like Call Drop rate, Call setup success rate and Blocked Call rate, in different areas of Delhi./NCR region. These operators need to take corrective action to improve their networks.

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT
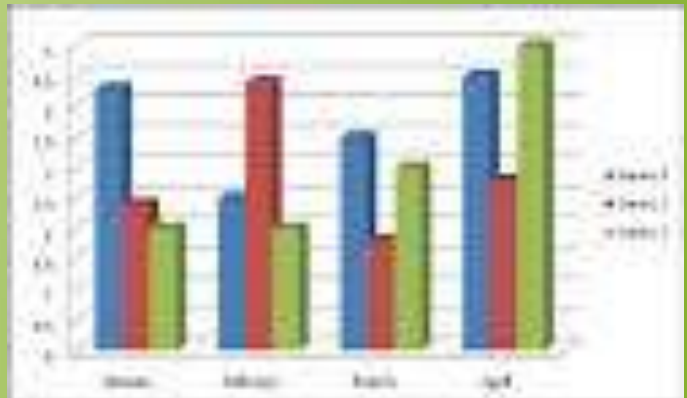
8) GRAPHICAL REPRESENTATION:

Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1. BTS ACCUMULATED DOWNTIME :

BTS Accumulated Downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	0.46%	0.01%	0.43%	0.01%	0.32%	0.12%	0.16%	0.16%	0.08%
Quarterly Live	0.44%	0.01%	0.33%	0.02%	0.39%	0.10%	0.09%	0.18%	0.07%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
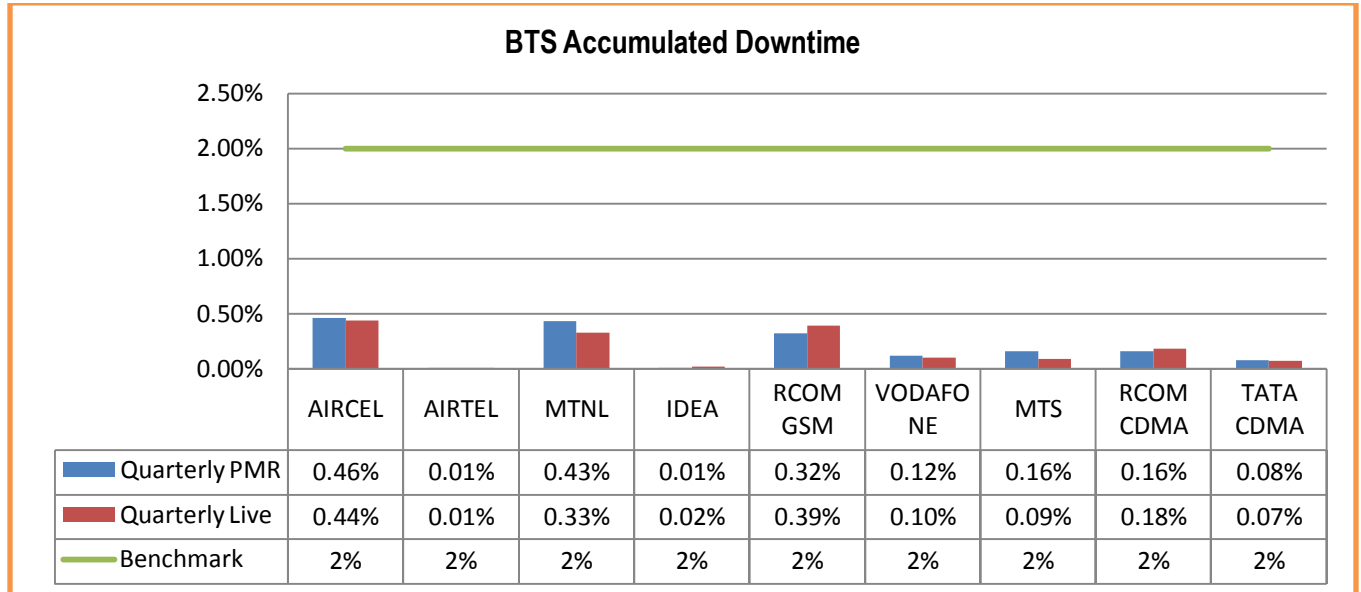
All operators are meeting the benchmarks.

2. WORST AFFECTED BTSs DUE TO DOWNTIME :

Worst affected BTSs due to downtime

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	2.55%	0.00%	1.70%	0.00%	0.55%	0.67%	0.90%	0.07%	0.16%
Quarterly Live	0.00%	0.00%	0.12%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
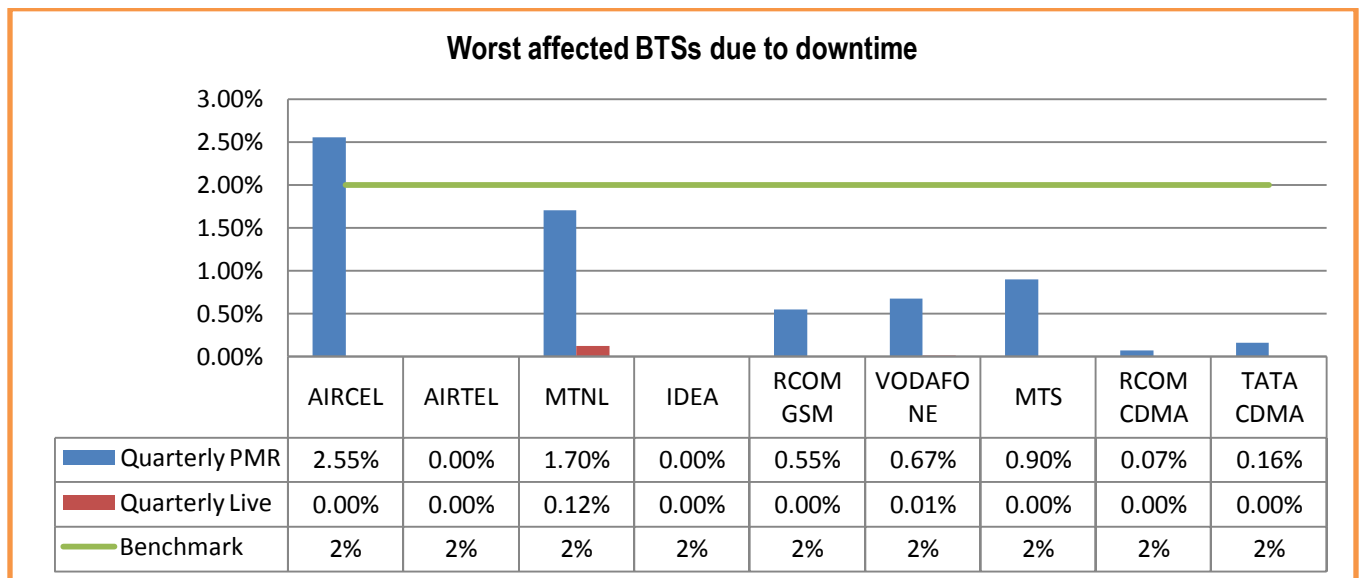
All operators are meeting the benchmarks except Aircel.

3. CALL SETUP SUCCESS RATE :

Call Setup Success Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	97.14%	99.79%	96.46%	99.96%	99.59%	99.70%	98.61%	97.42%	98.97%
Quarterly Live	97.14%	99.81%	96.62%	99.95%	99.61%	99.72%	98.75%	97.09%	98.98%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%
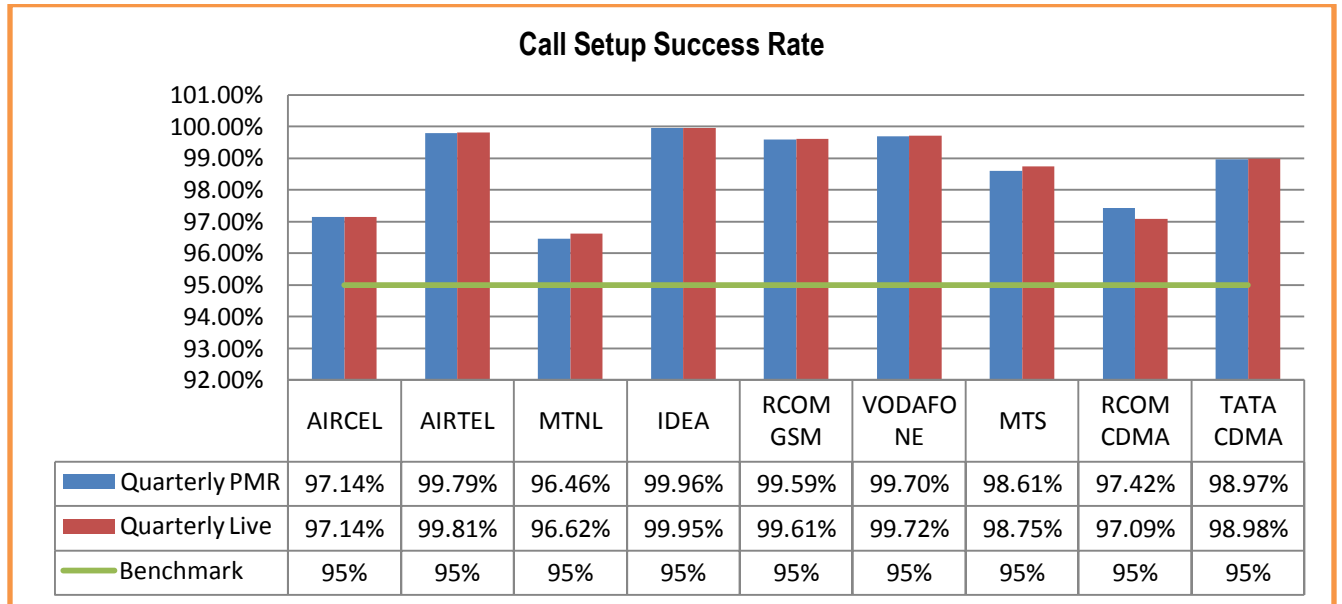
All operators are meeting the benchmarks.

4. SDCCH/PAGING CHANNEL CONGESTION :

SDCCH/PAGING Channel Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	0.66%	0.04%	0.61%	0.50%	0.03%	0.02%	0.00%	0.00%	0.00%
Quarterly Live	0.56%	0.03%	0.56%	1.02%	0.05%	0.01%	0.00%	0.00%	0.00%
Benchmark	1%	1%	1%	1%	1%	1%	1%	1%	1%
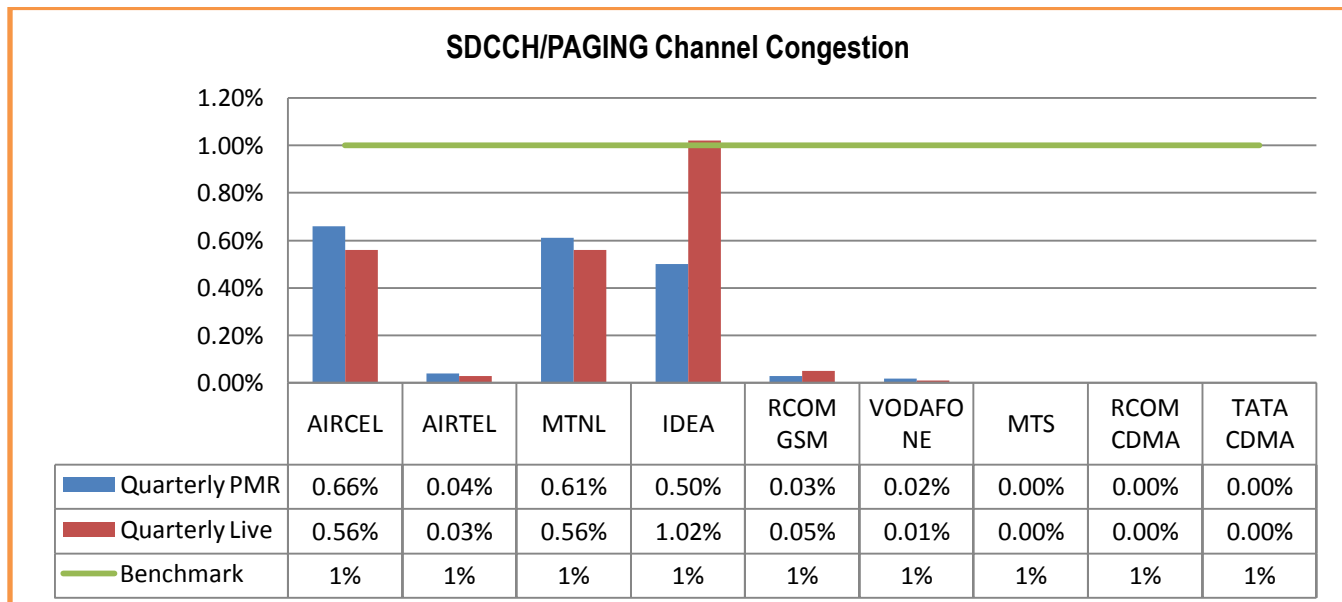
All operators are meeting the benchmarks except Idea during 3 days live measurement.

5. TCH CONGESTION :

TCH Congestion

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.75%	0.13%	1.67%	0.90%	0.06%	0.08%	0.40%	0.07%	0.10%
Quarterly Live	1.53%	0.13%	1.65%	0.93%	0.05%	0.08%	0.27%	0.07%	0.08%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
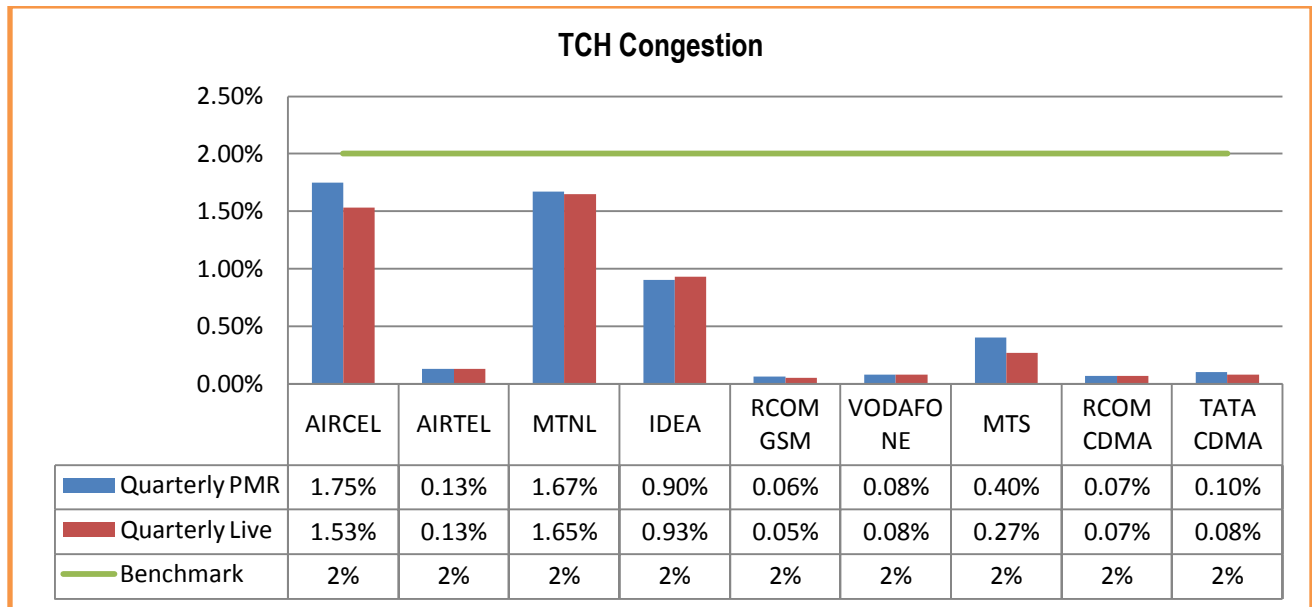
All operators are meeting the benchmarks.

6. CALL DROP RATE :

Call Drop Rate

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	1.39%	0.69%	1.83%	0.56%	0.37%	0.90%	0.80%	0.38%	0.58%
Quarterly Live	1.39%	0.66%	1.80%	0.55%	0.36%	0.87%	0.77%	0.39%	0.58%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%
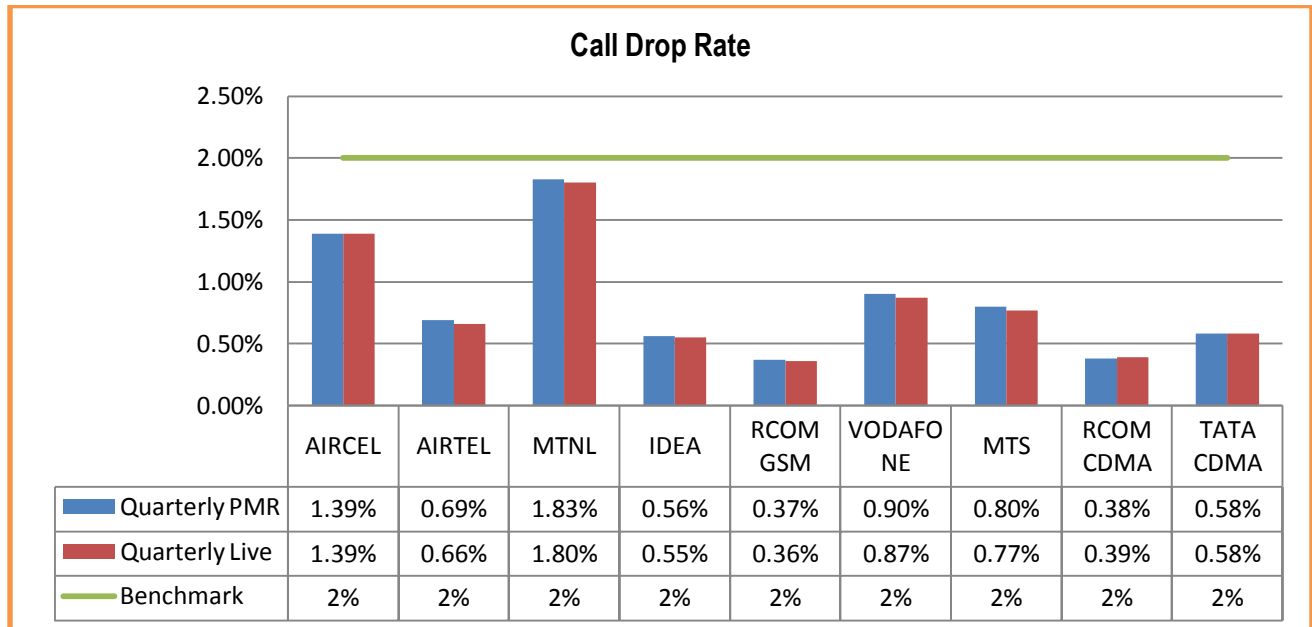
All operators are meeting the benchmarks.

7. WORST AFFECTED CELLS>3% TCH DROP :

Worst affected cells>3% TCH drop

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	9.24%	0.97%	2.29%	1.48%	0.10%	2.77%	1.94%	2.33%	2.72%
Quarterly Live	9.35%	0.91%	2.38%	1.45%	0.10%	2.78%	1.90%	2.72%	2.35%
Benchmark	3%	3%	3%	3%	3%	3%	3%	3%	3%
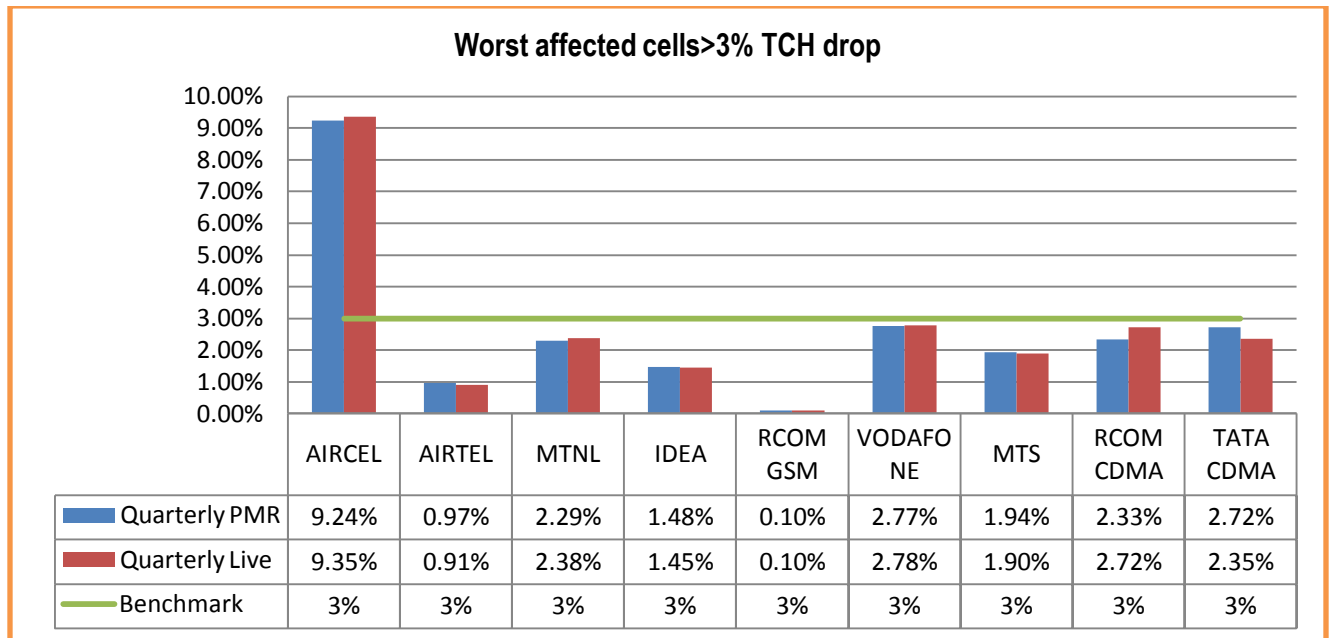
All operators are meeting the benchmarks except Aircel.

8. PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :

% Connections with good voice quality

	AIRCEL	AIRTEL	MTNL	IDEA	RCOM GSM	VODAFONE	MTS	RCOM CDMA	TATA CDMA
Quarterly PMR	97.32%	99.21%	96.92%	98.80%	98.78%	97.70%	99.19%	99.79%	99.03%
Quarterly Live	97.24%	99.25%	96.94%	98.81%	98.75%	97.69%	99.19%	99.79%	99.06%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%

All operators are meeting the benchmarks.